THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

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INSTRUMENTATION at the Gillette Rubber Factory

Complete Uniformity of Gillette Tires and Tubes Is Accomplished by Use of Time Cycle Controllers

By Reginald Trautschold, M.E.

AMONG the leaders in instrumentation of vulcanizing processes for the better part of a quarter of a century, the Gillette Rubber Company, Eau Claire, Wisconsin, has pioneered in substituting accurate machine timing for the less sensitive manual regulation of controls in curing inner tubes and bicycle tires. As curing times on their products have been reduced to just a few minutes and important advance has been made in vulcanizing practice, this company has led in the elimination of human errors in timing and kept its production up at minimum cost — with the result that all tires and tubes of the same style it now produces are in effect exactly the same.

Even such relatively modern regulating devices as double-system temperature controllers for the automatic adjustment of steam admission and condensate drainage, time controllers for shutting-off, also automatically, steam and admitting cooling water at the termination of the cure, and the use of recording thermometers for controlling temperatures and posting graphs of critical temperatures as they develop have been superseded in governing the operation of individual tire vulcanizers. Highly efficient cycle controllers have taken the place of these three separate instruments in this important undertaking and accurately time, not only the duration of the cure, but also its time relation to other essential steps in the vulcanizing process.

With these cycle controllers, accurate timing is secured by electrically timed motor-driven cams, so cut, or formed, as to cause a rider, or lever, to open and close pilot air valves according to properly predetermined schedules of operation. When the cure involves from its start a sequence of steps which can be quickly repeated in reverse order in consummating the curing cycle, a single-cam controller is used, while should the starting and stopping of the several process steps overlap, a multiple-cam controller has to be employed.

As installed on individual tire vulcanizers, twenty-five cycle controllers, governing fifty vulcanizing units, have time-selector cams, one for controlling the operations of the individual tire presses and the other for determining just when these operations occur. However, since the operations almost invariably occur in the same given order, or sequence, the settings of the operational cams have rarely to be altered when the timing of a cure is changed.

Ordinarily, it is only necessary to relocate the position of notches on the periphery of the circular timing cam, the rotation of which is automatically reversed at mid-cycle and always stops, on completion of the cure cycle, at the exact starting point for the vulcanizing operation. Consequently, the length of the cycle, its duration, can be changed at will by simply adjusting the mid-point of the cycle.

Construction of the Timing Cam

The timing cam is made up of two concentric discs of the same diameter, one of which functions on the advance and the other on the reversal of the steps in the curing cycle. The timing notches, adjustable as to position, on the periphery of each section of these "duo-purpose" cams actuate an electric switch, effecting the reversal without mechanical complications. The proper switch, manipulated by the timing cam notches, simply opens a solenoid-operated air-valve to exert pressure on a powerful spring-opposed piston, insuring positive and unfailing operation.

The separation of the selector, or operational, and timing cams also enables operations to be consummated much more promptly than heretofore and, by having the selector cam operated by a separate motor, quick changes, or adjustments, of the press-operating pilot valves can be made in either direction.

In the department where the larger tires are cured, batteries of pot heaters, each unit holding twenty tires, are operated under multi-cam cycle controller regulation, to which is attributed in the main the uniformity of product and the virtual elimination of "rejects" at the Gillette plant. The automatic control effected by the instruments insures unfailing accuracy in timing and uniformity in temperature control throughout the heaters, with resulting marked economy in steam consumption.

Automatically, these cycle controllers govern the operation of a sequence of sensitively timed process steps, as follows:

(1) Admit steam to bags for steaming period.

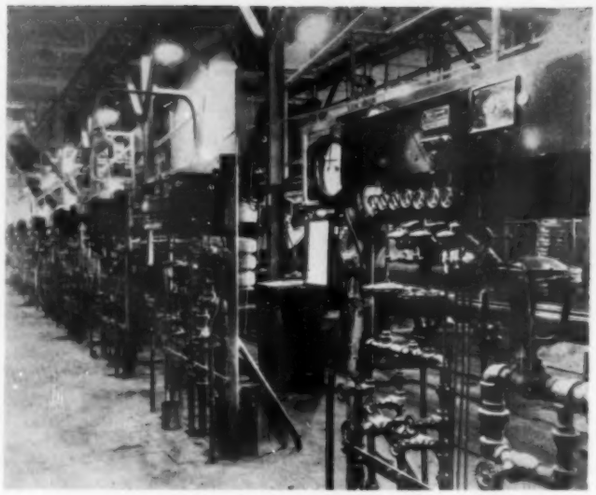
(2) Shut-off bag vent for fraction of a minute.

(3) Shut-off steam to bags and open vent from bags for a definite interval.

(4) Admit steam to bags and close vent from bags for several minutes.

Courtesy, C. J. Tagliabue Mfg. Co.

One of the Gillette departments containing 50 single De Mattia individual tire vulcanizers equipped with Tag cycle controllers.



Courtesy, C. J. Tagliabue Mfg. Co.

Each of the 18 pot heaters in this tire department at Gillette is equipped with a Tag multi-cam cycle controller.

(5) Shut-off steam to bags and admit water to bags, simultaneously starting the test clock, followed by shutting-off the water to the bags.

(6) If test clock indicates excessive leakage within 20 seconds, the controller stops functioning and a red light is flashed and burns until operator investigates and repairs leak. After stopping leak, operator resets controller so that the automatic test period is repeated and if leakage is then not excessive the cycle of controller operations continues.

(7) External steam admission valves and external condensation discharge valves are both opened, throttling to conform to a predetermined curing schedule of raising the material to the curing temperature at a definite constant rate and maintaining the holding temperature until the end of the cure.

(8) A few minutes after the start of the holding period, water to bags is shut-off and bag valves to drain opened.

(9) A few minutes after the start of the holding period, external steam admission valves close, blow-down valves open and external condensation discharge valves close.

(10) Controller stops, clock stops, with all valves in correct position for the start of another curing cycle.

An efficient conveyor system aids in expediting cures and greatly facilitates loading and unloading operations, while several automatic safety stops go far to eliminate all danger of accidents. The result is that two batteries of pots, totaling eighteen heaters, are operated under this coordinated instrument control system by a crew of nine men.

Instrumentation General Throughout Plant

Besides these cycle controllers governing vulcanizing operations, instrumentation has been carried quite generally throughout the plant. The high-temperature, high-pressure water supply system for the internal heating of tires in the individual tire presses and in the pot heaters is held at plus or minus 1-degree Fahrenheit of the predetermined setting point by a temperature-recorder-controller. The web fabric machine room is kept at uniform temperature by automatic and sensitive adjustment of the admission

(Continued on page 378)

Latex Patent Suit

The Verbatim Decision of Judge Carroll C. Hincks in the U. S. Rubber Co. vs. Sidney Blumenthal & Co. Case

DISTRICT COURT OF THE UNITED STATES
DISTRICT OF CONNECTICUT

UNITED STATES RUBBER CO. v. SIDNEY BLUMENTHAL & CO., INC. } In Equity No. 2454

Gifford, Scull and Burgess, Esqs., of New York, N. Y., Solicitors for Plaintiffs: (Newton A. Burgess, Esq., and Henry M. Leigh, Esq., both of New York, N. Y., of counsel);

David L. Daggett, Esq., of New Haven, Conn., Solicitor for Defendant; (E. Clarkson Seward, Esq., and W. Saxton Seward, Esq., both of New York, N. Y., of counsel).

This is a suit for the infringement of three patents, namely, Gibbons, No. 1,654,167, issued on December 27, 1927, upon an application filed December 17, 1923; Hopkinson, No. 1,784,523, issued December 9, 1930, upon an application filed June 21, 1924; Foster and Cook, No. 1,816,574, issued on July 28, 1931, upon an application filed March 7, 1929. The usual defenses of invalidity and non-infringement have been interposed. And in addition the defendant has pleaded a defect of parties-plaintiff.

Finding of Facts Pursuant to Equity Rule 70½

1. The parties have entered into a comprehensive stipulation of facts which was marked in evidence as "Exhibit 8." This is hereby made a part of this finding.

2. To supplement Paragraphs 1 and 6 of said stipulation, I further find as follows, viz.: That by its answer (Par. 15) and amended answer (Par. 15), the defendant pleaded a defect of parties-plaintiff; that prior to the trial the plaintiff filed no motion for argument upon said objection pursuant to Equity Rule 43; that at the beginning of the trial the defendant pressed its said objection, whereupon in answer to plaintiff's inquiry as to whether it might then be heard upon the subject, the court suggested that "We wait until we get some proofs in the record"; that thereafter throughout the trial neither party pressed the court for any ruling upon the subject-matter, nor was any motion addressed to the subject-matter made or filed by either party at the close of the trial, but the objection was renewed by the defendant upon its briefs.

3. The plaintiff's chemical expert witness, who had served the plaintiff not only as a research chemist, but also as a sales manager and sales promotion manager, was allowed without objection by the defendant and without any offer of the plaintiff's sales or financial records, to state his conclusion that the "three inventions of these patents in suit have been used together in the manufacture of pile fabrics by the (plaintiff's) licensees to the extent of something over fifty million square yards in the past few years." Neither party offered in evidence any specimens of the commercial product of the plaintiff or its licensees. Nor was other evidence offered tending to show that such commercial success as plaintiff's products had attained was attributable to patentable invention inherent in any one or more of the three patents in suit.

4. I further find that the representations set forth in Paragraph 2 of the stipulation with reference to the defendant's normal commercial operations were in fact true; that its operations were in fact as therein set forth; and that the only coating materials used by the defendant in the processes and articles charged to infringe consisted of the vultices specified in said Paragraph 2(b). These vultices were purchased by the defendant ready-made, fully prepared, in condition for immediate application.

5. By agreement between the parties on March 15, 1937, there was filed a plaintiff's motion to reopen this case to permit of the introduction of excerpts of testimony given by the defendant's expert in equity suits Nos. 4023 and 4281, brought by the Vultex Corp. of America against Heveatex Corp. in the United States District Court for the District of Massachusetts, a case decided by Judge Brewster by opinion dated April 23, 1937. On the same day an answer to said motion was filed by the defendant and a reply thereto by the plaintiff. Said motion is pending awaiting decision.

6. The plaintiff's case on the issue of infringement was based upon the conclusions of its expert and his conclusions at least with respect to the alleged infringement of Gibbons, were in turn based upon tests made by another chemist in plaintiff's employ upon samples of the vultices used by the defendant. These tests were what were known in the art as (a) the T-50 test; (b) the free sulphur test; and (c) the combined sulphur test. All three of these tests were made (1) upon films of crude rubber obtained by plaintiff's witness by drying the vultices used by the defendant at room temperature (Transcript, page 60), and (2) upon completely dried samples of the defendant's product taken at its successive stages through the defendant's process. None of these tests were adapted or adequate to show whether or not said samples, both those made by plaintiff's witnesses from the vultices and those taken from the defendant's products, had acquired any vulcanization whatever after the first treatment or first application of the liquid vultices and prior to the time that the vultices had become coagulated or dried. At a later stage in the trial to be sure, a chemist in plaintiff's employ, when called by the plaintiff, testified that he had made a so-called chloroform test. The test, however, was without significance for the witness stated that in each case the resulting coagulation failed to indicate whether the coagula were vulcanized or not. If and in so far as any of the samples tested by the plaintiff were found to be vulcanized, for aught contained in the entire record such vulcanization may have occurred possibly *before* the vultices were applied or indeed sold to the defendant (as the defendant has throughout contended) or in any event *after* the coagulation or drying of the vultices was completed. Thus, referring specifically to the step in defendant's process described in the stipulation of facts Paragraph 2(f) and (g), there is no evidence to show how much of the eight minutes required for the step was required to coagulate or dry the product. For aught that appears the product may have been coagulated or dried in, say, three minutes and any vulcanization thereafter disclosed by test may have taken place only in a dried or coagulated latex during the remaining five minutes of the step, or indeed during the time intervening prior to the making of the test.

With Particular Reference to Gibbons

7. The plaintiff offered as a witness the patentee, a research chemist long in the employ of the plaintiff, who testified that he had conducted a series of experiments in 1919 and 1920 and interpreted his contemporaneous record of said experiments in a note book which was itself received in evidence. There was nothing in the note book, however, or indeed in the testimony of the patentee to show the consummation of an experiment wherein vulcanization was actually accomplished prior to coagulation or drying, nor at a temperature less than 240° F., which plaintiff's own expert indicated was the low limit of temperatures "ordinarily employed in hot vulcanization methods." To be sure, on page 65 of the note book, under date of September 13, 1919, is shown a latex compound containing a high powered accelerator, but the entry shows neither that the compound was vulcanized prior to drying nor that in that instance the compound was in fact dried and vulcanized at all. Instead, it was noted that the compound was abandoned in preference for "a different latex

compound which would not vulcanize at, say 212°—thus enabling us to dry at 212°."

8. Curtis, a research colleague of Gibbons in the employ of the plaintiff which maintained a single patent service for use by all its research employees, in 1926 obtained a patent, U. S. No. 1,605,649, upon an application dated July 17, 1923, wherein he disclosed a process for proofing haircloth in all respects similar to the Gibbons process except that in Curtis it was disclosed that the vulcanizing followed drying.

Schidrowitz, U. S. No. 1,156,184 (1915), disclosed the production of a dried and vulcanized rubber product by mixing vulcanizing ingredients, including "accelerating agents," with latex "either before or during the incipient stage of coagulation" and thereafter vulcanizing while the coagulum was still wet. He contemplated broadly the use in the mixture of "accelerating agents, or any one or more of the ingredients ordinarily employed in rubber mixings." He further contemplated the use of some such material as ammonium carbonate for its gassing effect which was desired for the spongy product which was his objective. The expert evidence is in conflict as to whether ammonium carbonate was an organic high-powered accelerator under the terminology of the art as of the effective date of Gibbons. (In view of the conclusions which I have in mind presently to state, it is unnecessary to solve this conflict). I do find, however, that this reference contains no disclosure of low temperature vulcanization.

Bruni, Italian No. 173,322, issued on September 9, 1919, on an application valid as from March 15, 1919, and Italian No. 173,364, issued October 4, 1919, upon an application also valid as from March 15, 1919, discloses a process for the vulcanization of "rubber, or of objects made of natural or synthetic gum elastic (rubber), of any nature whatever by the application of organic, high-powered accelerators capable of vulcanizing at temperatures" as low as the "ordinary ambient temperature" or "in a much shorter time than that usually taken," or "at temperatures which are much lower than those customarily employed for vulcanization in the hot, for instance, temperatures below 100°" (meaning 100° C.).

With Particular Reference to Hopkinson

9. As long ago as 1791, Peal (British 1,801) conceived a process for waterproofing "hide, skin, leather, cloth, silk" by a brush-given "regular thin coating" of rubber dissolved in turpentine or oils. Hancock, British No. 5,122 (1825), after a naive description of Hevea latex and the process of its "inspissation" discloses a process for its application to "fibrous substances" which are "saturated or coated," followed by a drying. As early as 1863 the application of a concentrated latex was disclosed. (Siemons, British No. 464). In 1868 the use in the United States of natural latex for waterproofing fabric was disclosed by Bishop, U. S. No. 73,288. Morisse Publication *"Le Latex"* in 1909 taught that a concentrated latex would not penetrate, but that penetration makes for adhesion. Milne, British No. 24,680 of 1914, disclosed an uncoagulated concentrated latex mixture. Britton, British No. 184,578, of 1922, disclosed a process for the preparation of rubberized materials which consists in applying a stabilized, thickened latex to the material, followed by drying and vulcanization. (See also McGavack, U. S. No. 1,523,821, filed July 11, 1923).

With Particular Reference to Foster and Cook

10. Both the Gibbons and the Hopkinson patents in suit were offered as references against Foster and Cook.

The defendant also offered Crabtree, U. S. No. 2,007,078, issued upon an application dated August 10, 1926. This reference discloses an article comprising (1) a pile fabric (2) upon the back of which has been applied a cementitious binding material to anchor the V's of the piles to the ground of the fabric. Also, it is said: "The coating compound may consist of a solution of pyroxylin and vegetable oil, or in other cases may be a rubber composition or any other viscous fluid of a cementitious nature capable of adhering to the back of the fabric and hardening thereon." The specification discloses that the usual method of application was by a "doctor blade" for pyroxylin and by calendering for a rubber compound. It is further stated, "that various modifications may be made in . . . the composition of the material used as a coating, and in the method of applying the coating."

Discussion on Gibbons

Gibbons' single claim is as follows: "Process of manufacturing vulcanized rubber compositions which comprises the drying and vulcanization of substantially uncoagulated rubber latex containing an organic accelerator capable of effecting vulcanization at temperatures below those ordinarily employed in hot vulcanization methods."

The plaintiff contends that this claim is broad enough to include a process wherein the vulcanization begins after the drying is completed as well as one in which the vulcanization begins contemporaneously with the drying step. Thus the contention apparently is that the claim is broad enough to be construed both as a one-step process wherein drying and vulcanization go forward contemporaneously (though to be sure, the process of vulcanization may continue after the drying has been completed), or as a two-step process wherein first the step of drying is completed and then the second step of vulcanization begins.

This construction I am unable to sustain. I hold rather that the claim must be limited to comprise a process wherein vulcanization and drying proceed contemporaneously. This construction is indicated by the very language of the claim. The process "comprises the drying and vulcanization of . . . latex" as described. The phrase "of latex" by every rule of syntax limits both the "drying" and the "vulcanization." If then, as plaintiff urges, the claim were extended to cover vulcanization beginning after the drying had been completed, the subject matter of the vulcanization would not be an "uncoagulated rubber latex" as specified in the claim, but rather a coagulated film of crude rubber. For necessarily during the drying, coagulation will take place and before the drying is completed the coagulum will become crude rubber, compounded or otherwise.

This construction is not inconsistent with the specifications. In the four examples set forth in the specifications, it is stated that after the specified mixture is obtained "upon drying and heating the resulting composition . . . vulcanization is accomplished." This language seems to indicate that vulcanization is accomplished during the drying as well as the heating step. Then again the specifications state, "The invention accordingly comprises a process for preparing, drying and vulcanizing a latex composition," containing such ingredients as do "not coagulate the latex." Here again the language suggests that the subject-matter of vulcanization is an uncoagulated latex composition to the exclusion of material which through drying has become coagulated.

Moreover, the same limitation upon the scope of the claim is required to give it validity in view of the prior art. Thus Curtis (Finding, Par. 8) disclosed every essential shown by Gibbons, except that the Curtis disclosure was limited to vulcanization "after drying."

To be sure, the plaintiff has sought to escape the anticipatory effect of Curtis by offering evidence from which it is contended that the effective date of the Gibbons invention must be advanced to 1919. (See Finding, Par. 7). This evidence, however, I find insufficient to attain its end. For the note book discloses that Gibbons' only experiments were ones in which vulcanization was accomplished at 40 pounds steam pressure (which is the equivalent of 287° F., and hence was a "hot vulcanization" as distinguished from one "at temperatures below those ordinarily employed in hot vulcanization methods" within the meaning of the Gibbons claim), or were experiments in which so far as the documentary evidence discloses, the vulcanization did not begin until after the drying of the latex had been completed.

To be sure, the plaintiff argues that since the note book shows experiments wherein a high-powered accelerator had been mixed with the latex, Gibbons, if he had chosen, might have vulcanized at a low temperature. The argument, however, is specious. For a reduction to practice, especially in a chemical field such as is here involved, must be proved (and proved with the high degree of certainty required by the authorities) not by what an inventor might have done, but by what he actually did. *(Corona Co. v. Dovan Corp., 276 U. S. 358).* Stated otherwise, the entry on page 65 of Gibbons' note book may at most be taken as evidence that he then *believed* the compound described would vulcanize at low temperatures. It does not, however, prove that he then *discovered* its capacity for low temperature curing, in the absence of proof that he had successfully used it for curing

at low temperature, especially since the same entry discloses that the goal of his experiment was a composition curing only at high temperature, such that it might dry without curing at 212°. And in this connection it may be noted that the patentee did not apply for his patent until four years after the date on which it is now claimed that he made his discovery.

But even if the plaintiff were correct in its contention that Gibbons has priority over Curtis, other references compel me to the limited construction of the Gibbons claim set forth above. Thus when Bruni (Finding, Par. 8) had disclosed organic, high-powered accelerators (even though it be conceded that his disclosure was limited to application to crude rubber as distinguished from latex—a concession of doubtful validity), and when Schidrowitz (Par. 8) had disclosed the mixture of accelerators (without generic distinction) with latex and a consequent vulcanization of a coagulum, I hold that it required no patentable invention to combine the two disclosures into a single process, wherein the vulcanization takes place only after coagulation (as in Schidrowitz) or after drying (as in Bruni).

A contrary holding could be justified only on the ground that Gibbons embodied as an essential element of his claim a method for the *preparation* of compounded latex. Such a view finds some support in Gibbons' specifications. It finds further support in evidence that it was a matter of considerable difficulty to prepare a mixture without causing premature coagulation or decomposition of the vulcanizing ingredients. However, the plaintiff has vigorously opposed such a limitation upon Gibbons' claim, doubtless foreseeing that it leads straight to a holding of non-infringement. For the defendant does not mix its compounds; it buys them ready-made. Thus the plaintiff says by brief: "There is nothing to show that the latex accelerator compounds could not have been put together in many ways known to the art. There is nothing in the prior art that forces such limitations upon the claim." That being so, it is well-nigh certain that it required no patentable invention for Gibbons to take organic, high-powered accelerators (Bruni) and mix accelerators, high-powered or otherwise, with latex (Schidrowitz) and *after* coagulating (Schidrowitz) or drying (Bruni) the compound, obtain vulcanization. It follows that the Gibbons' claim can be given validity only in so far as it is limited to a process in which the vulcanization begins before the drying is completed.

It may also be observed that the file wrapper shows that numerous claims were rejected and no claim was allowed until by amendment the word "uncoagulated" was inserted as a limitation, further indicating, although perhaps somewhat uncertainly, that the only invention which the Patent Office recognized was the vulcanization of a compounded latex, the vulcanization beginning prior to coagulation.

Adopting, then, my limited construction of the claim and assuming without deciding that the claim thus limited has validity, I turn to the question of infringement. On this issue the plaintiff has introduced much evidence tending to show that the vultices used by the defendant are in a progressive process of vulcanization throughout the successive manufacturing steps performed by the defendant. The defendant, to be sure, has produced much evidence looking the other way. And the experts of the respective parties are in conflict. The construction of the Gibbons' claim, indicated above, makes a decision on this issue unnecessary. For all of the plaintiff's evidence, including the testimony of its experts, is predicated upon the tests mentioned in the finding. (Par. 6) And these tests, in the light of the facts drawn from the evidence and from the lack of evidence set forth in the finding (Pat. 6), are insufficient to support a finding that the defendant vulcanized latex prior to its coagulation.

Discussion on Hopkinson

The claims at issue are 1 to 7, inclusive, which are process claims, and 12 and 13, which are article claims. Claim 2 may be taken as fairly typical of the process claims. It is as follows: "The method of making rubberized articles of fibrous material which comprises superficially coating normally penetrable fibrous material with a thickened and compounded water emulsion of rubber without substantial penetration of the material, and drying, thereby attaining a minimum loss of flexibility."

All of the process claims have to do with the coating of "normally penetrable fibrous material." The phrase requires construction. In the opinion of the plaintiff's expert, the phrase means a fibrous material penetrable by normal latex. In the opinion of the defendant's expert the phrase means something in the nature of an open weave fabric or one without pile. Both views I must reject as being without support in the disclosure of the patent. For the specifications show that the process of the patent was intended for application to "any suitable fibrous material . . . such as woven or knitted fabric, weftless corded fabric, felted material, or other fibrous material such as leather, either in sheet or other form." The classification thus suggested is far broader than is consistent with the construction suggested by either expert.

Instead, I construe the phrase to mean any suitable fibrous material which has not received an artificial, water-repellent treatment effective to clog up the interstices of the fabric. This construction is required by a reading of the patent itself, not to mention the support which it receives from the file wrapper. Thus, claim 9, for example, of the patent in suit (which is not here in issue) discloses a two-step process whereby the fabric base is first treated with a water repellent and to the resulting product the single step of a claim such as claim 2 is added to complete the two-step process. (A description of this process is found in the specifications). Obviously, the words "normally penetrable", as used in the first seven claims, was used to distinguish the fibrous material thus described from the artificially treated fibrous material to which the second step of the process described in claim 9 was applied. The language seems well adapted to accomplish this purpose and I see no reason to look further for some occult meaning in the phrase. It may, however, be observed from the file wrapper that the Patent Office had cited Sutton against claim 9, as issued (claim 14 of the original application), and that subsequently the patentee by the use of the phrase in question, perhaps out of abundant caution (Sutton is not in evidence in this case), sought to safeguard the first seven claims, at least, from collision with Sutton.

It will next be observed that the first seven claims all close with the phrase "thereby attaining a minimum loss of flexibility." I am unable to see that this phrase is a limitation upon the claims. It serves but to state one of the principal objects of the patentee. If the process claimed is operable, which seems not to be disputed, it is equally operable with that phrase deleted.

However, the "flexibility" phrase must be read in connection with the direction that the application of coating to fabric must be "without substantial penetration," a direction appearing in all of the claims except claim 4. For it is not disputed that the restriction upon penetration was intended as an aid to flexibility. But the parties also agree that for a satisfactory bond between coating and fabric, certain penetration is necessary. And, of course, without a satisfactory bond, the claims are utterly lacking in utility. The plaintiff thus is in the position of contending that a penetration concededly essential to the bond is not a "substantial" penetration within the meaning of this phrase.

However, this apparent inconsistency can be reconciled by construing together the "flexibility" phrase and the phrase "without substantial penetration" to mean a penetration no greater than required for bonding (thus resulting in a minimum impairment of flexibility).

Construing the claims as above indicated, I come speedily to the conclusion that the first seven (process) claims are lacking in patentable invention.

It appears to me that the patentee in his application, with its amendments, as indeed the plaintiff throughout the conduct of this litigation, has failed to mark the boundary between the fields of invention and business. True it may be that the prior art shows no single reference which constitutes a precise anticipation of the precise claims here involved. But neither does the record show a history of long effort to achieve the narrow advance over the prior art disclosed by this patent. The prior art (Finding, Par. 9) does indicate, however, that one of the earliest fields for the use of rubber was that of waterproofed fabric (Peal, Hancock). By 1924 (Hopkinson's application date), if the manufacturer or merchant called for a firmly bonded rubber-coated fabric, the technician could tell him that penetration would increase the bond (Morisse). If a flexible product was demanded, it was obvious that a vulcanized coating (claim 6) would serve better than one unvulcanized, and other factors being equal

that a thin coating was preferable to a thick one. Where a thin coating was thus called for, it required no patentable invention to know that penetration should be restricted as far as consistent with the necessity for a bonding. When there was a demand for a coating on one side of the fabric which would not alter or mar the appearance or texture of the other side, surely the requirement of a minimum penetration was obvious. But Morisse had taught that a thickened latex would decrease penetration, and the prior art was replete with methods for thickening and concentrating latex compounds, *e.g.*, Gibbons.

To be sure, it may have required experience and skill to devise a process wherein the penetration should be sufficient to accomplish a satisfactory bond, and at the same time not so to extend it as to impair flexibility or to deform or injure the fabric. But that the routine skill in the art was adequate for this purpose without any draft or inventive genius is clearly indicated by the patent itself. For the patent purports to apply to fibrous articles so widely variant as leather and knitted fabrics. It needs no evidence to show that the size of the interstices in these materials varies widely. The patent also specifies latices, compounded, concentrated, or both, of widely varying viscosities. Yet there is nothing in the patent to teach the proper adjustment for the wide variance of fabric and compound. Obviously, to obtain a perfect result, a skilled judgment might still need the aid of experiment, notwithstanding the disclosure of Hopkinson. And in the Hopkinson patent I see only the record of a few experiments successfully conducted by one skilled in the art utilizing the obvious and the known.

What has already been said, I think, also disposes of the article claims. For their conception, not invention was required but only a business acumen which could foresee a market for products having such characteristics, in combination, as had been disclosed, individually, in the prior art. The combination involved no new problem; it was within the range of any competent technician.

Discussion on Foster and Cook

Of the eleven claims of the patent, all are in issue except claims 4 and 9. All of the claims in issue are article claims except claim No. 10 which is a process claim. The article claims purport to cover a material having the following elements, *viz:*

(1) A pile fabric including in addition to the conventional fabric long known in the textile field, a fabric in which the piles instead of being woven into the base are loosely needled in.

(2) An anchoring means to hold the piles in place in relation to the base of the fabric, said anchoring means consisting in a thin coating of rubber, the said rubber having been dried *in situ* from thickened water dispersion of rubber.

Claim 2 may be taken as typical. It is as follows: "As a new article of manufacture, a flexible sheet of material comprising a base of fibrous material, a multiplicity of strands of fibrous material extending from one side of the base, each strand having a loop disposed on the opposite side of the base secured against displacement by a thin anchoring coating on said loops and on said opposite side of the base comprising a dried *in situ* deposit from a thickened aqueous dispersion of rubber."

I am unable to find in the Foster and Cook article claims any patentable invention. Hopkinson had already shown the rubber coating on a *woven* fabric base. Crabtree had extended the disclosure to include a *pile* fabric having a woven base, pointing out that the coating was effective and especially useful as an anchorage for a loose pile. Over such references, at most the Foster and Cook article claims could have validity only if limited to fabric in which the tufts are *needled* in, to the exclusion of pile-fabric in which the piles are *woven* in.

But even with such a limitation no patentable advance over Hopkinson and Crabtree is disclosed. In the textile art, the problem of holding the piles in place in relation to the base fabric has been solved by a weaving means. For this conventional solution, Hopkinson and Crabtree had substituted a coating means, such that the coating might serve as an anchorage for piles. This solution was such that the need for weaving in piles was wholly eliminated. The need for such a weaving being gone, thanks to Hopkinson and Crabtree, it required no invention to substitute for the weaving in of piles, the needling in of looped tufts.

The process claim (10) is equally without patentable merit. There is nothing in the record to suggest that the Hopkinson disclosure was not as effective in its application to the Foster and Cook fabric as generally to the broad class of fabrics covered by Hopkinson's disclosure. On the contrary, the introduction of piles or tufts through the base fabric would obviously tend to make the product more impervious to penetration by the coating. And an absence of substantial penetration was an inherent part of Hopkinson's conception, as we have seen. Foster and Cook have merely applied the Hopkinson process, without any significant modification, to a material for which the process was well adapted.

Discussion on Plaintiff's Motion to Reopen

The views expressed above are not at all dependent upon the subject-matter of this motion. The substance of the motion being thus immaterial, on that account alone it should be denied. But even if the case turned upon the testimonial weight to be accorded to the defendant's expert, I should still feel constrained to deny the motion. For brief excerpts of testimony torn from their context in another case dealing with issues not disclosed, may not safely be used for purposes of impeachment. To be sure, impeachment is a proper function of cross-examination. But the right of cross-examination is a right qualified by the correlative right of redirect examination. Were I to grant the motion at this stage, the effect would be to allow an extension of the cross-examination while denying the correlative right of redirect examination.

I come, therefore, to the following:

Conclusions of Law

1. That no earlier date has been proved for the Gibbons patent in suit than the date of its application.
2. That, quite independent of the foregoing conclusion, the Gibbons patent in suit must be construed as limited to a process wherein the drying and vulcanization of the compounded latex proceed simultaneously and thus construed has not been shown to have been infringed.
3. That the Hopkinson patent in suit, with respect to all of the claims at issue, is invalid for want of patentable invention
4. That the Foster & Cook patent in suit, with respect to all of the claims at issue, is invalid for want of patentable invention.
5. That the Plaintiff's motion to reopen must be denied.
6. That in view of the conclusions above stated, there is no need to determine the validity of Gibbons or whether or not if Hopkinson and Foster & Cook were held to have any validity, infringement thereof has been proved, or whether or not there is a fatal defect of parties-plaintiff.

A decree may be submitted dismissing the bill, with costs to the defendant.

Dated at New Haven this 10th day of August, 1937.

CARROLL C. HINCKS,
United States District Judge.

Reclaimed Rubber in Tires

THE use of reclaim in first-grade carcass stocks for passenger car tires is generally considered when crude rubber prices are on a rising market. One compound incorporating reclaim, recommended by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., consists of the following: 85 parts of smoked sheets, 30 parts of high zinc oxide truck tire reclaim, 13.5 parts of whiting (fine particle size, such as Calcene), 0.5 parts of stearic acid, 1.5 parts of palm oil, 0.3 parts of Accelerator 808, 3 parts of sulfur, and 1 part of Neozone D. DuPont recommends 45 minutes of optimum press cure at 274° F. for a thin sheet. The stock is said to be suitable for the carcass of first-line passenger car tires. The recommended compound is part of DuPont Laboratory Report IR-5.

Indicating Tire Balance

Goodrich Engineers Explain Methods of Indicating Tire Balance by Means of a System of Round Dots

BY means of a system of dots placed on the sides of automobile tires, near the rim, manufacturers indicate how well the tires are balanced, and at what point with respect to the casing the inner tube valve should be placed when a tire is mounted. These dots, which may be square, round, triangular; or single or in pairs, are red, and invariably are placed at the point on the casing where the inner tube valve should go.

There is no universal system of tire marking to indicate balance. Some tire manufacturers select their best balanced tires and mark them for front-wheel use, where balance is highly important. Tires that do not come quite to the front-wheel standard with respect to weight distribution are marked for rear-wheel use. Other manufacturers make no distinction, but produce tires that reach one definite standard of balance. Tires can be marked for front and rear wheel service only when they are shipped to automobile manufacturers as original equipment, with tubes in place in the casings and partly inflated.

The complete unit — casing and tube — is balanced so that, when used on wheels that have themselves been balanced, the result is an almost perfectly running wheel assembly. Tires sold directly to motor car owners are balanced, but, because there is no way of knowing the kind of inner tube that will be used with them, they are marked only for position of the valve stem.

Balance Now Necessity

Well-balanced tires became a necessity with increased driving speeds and more sensitive steering mechanisms. The future probably will bring a demand for even more carefully balanced tires than those which are satisfactory today, in the opinion of tire experts at the B. F. Goodrich Company where research on tire balancing is constantly under way at the Akron factory. There are numerous systems of balance marks in use. Tire manufacturers usually follow, with original-equipment tires, the specifications of motor car makers as to the exact type of marking used. In all cases, however, the marks are placed to indicate the valve stem position, which gives the best balance for the tire and tube.

One system of marking original equipment tires uses a square red dot on front casings, and a round red dot on rear tires, at valve positions. Another system makes use of two round dots on front tires, and one round dot on rear. Still another system employs triangular dots, the positions of the apex of the triangle indicating the degree of balance.

Tires intended for replacements are marked with a dot, usually a round, red one, to indicate the lightest point. All such tires are balanced. It is, of course, impossible to balance them as accurately as when the inner tube is in place. The motorist who is interested in having his wheels as perfect as possible can accomplish that only by having his wheels tested on a balancing machine.

Tire balancing machines, similar to that pictured above, are tested every morning in the Goodrich factory for sensitivity.

It is impossible to manufacture a tire or tube in which every inch of its circumference contains the same weight of material as every other inch. The same applies to wheels, rims and brake drums. That is why balancing is necessary. In an unbalanced tire, there is a heavy spot somewhere on the circumference. This spot, at high speeds particularly, pounds the road-surface like a hammer with a force that may reach surprising proportions. Such constant pounding can cause many motoring ills. It may damage the tire itself, cause the car to steer hard or, worst of all, gradually alter the wheel alignment and loosen various parts of the steering gear as a result of undue wear. One tire engineer has said that perhaps 99 per cent of wheel shimmy and similar steering ailments can be traced to out-of-balance tire and wheel assemblies.

Select and Match Units

The balancing of tires and tubes consists of selecting and matching those units to give the results wanted. In the first place, the tire casings and tubes are made as accurately as possible, in the matter of balance. Then, with the aid of delicate machines, the heavy spots on casings are determined, and the tubes inserted in such a way that these heavy spots are neutralized almost completely.

It is difficult for the average motorist to know when his wheels are in balance. Of course, if he has a new car, he can be reasonably sure that they are. However, when a tire is punctured and removed for repairs, the balance is destroyed. Presence of a

repair patch on the tube or a boot inside the casing naturally causes a redistribution of weight. Also, when a motorist buys a tire and a tube and installs them on the wheel himself, he may have the tube valve in the correct position to make the tube and casing balance, but his wheel may be so badly out of balance that any advantages are cancelled.

It is because of this situation that tire and motor car experts are predicting that, before long, every service station and garage will be equipped with wheel-balancing machines. Already, many of the larger stations, and official service branches of tire companies, have such equipment. There are various kinds of balancing machines. In all of them, the wheel assembly is tested to find the heavy spot. Then, by clamping small weights, usually two or three per wheel, on the rim, the balance can be brought to within very close limits. When wheel balancing becomes universal, steering ills will become less common, and accidents traceable to them be reduced.

In the routine testing of tires for balance in a tire factory, much of the work at present depends on the skill of trained men. In one plant, there is a row of machines that, by themselves, look like some strange kind of electric fans or windmills. Each machine consists of a post bolted to the floor, and having at the top a flanged aluminum wheel over which a tire is slipped to find its heavy point. Weights are attached temporarily to the tread to determine if the heavy point is within permitted limits. Each of these wheels is mounted on agate bearings, and is so carefully balanced that the weight of a penny resting on one of the flanges or blades will cause it to turn. Each morning the machines are tested to see that they are sensitive enough.

Other types of balancing machines are in use or in process of development. The objective is a completely automatic balancer, in which the judgment of trained men will be replaced by the more accurate judgment of a delicate, automatic weighing mechanism. In practice, a well-balanced tire and tube assembly will, when mounted on frictionless bearings, rotate when a penny is attached to any point around the tire circumference.

Shock-Absorbing Freight Wagon

SEEKING to provide protection for freight consignments by insulating them from shocks due to impact or to the snatching of couplings during transit or in shunting operations, a new type of shock-absorbing freight wagon has been developed by W. A. Stanier, chief mechanical engineer of the L. M. S. Railway of England. The new freight wagon was demonstrated at the St. Pancras Goods Depot in London on August 17. The wagon is of the 12-ton open type. In principle, the body "floats" on the chassis by means of a springing arrangement while additional protection from shock is given by special buffers.

The shock-absorbing element consists of two sets of horizontal rubber springs forming a buffing arrangement between the wagon body and chassis, and four sets of horizontal rubber springs which are attached to the chassis itself. The effects of any longitudinal shock delivered to the wagon are largely absorbed in compressing these springs. Longitudinal movement is assured, and lateral or vertical movement prevented, by the use of four slides which are connected to and support the body. Tests have indicated that normal shocks up to approximately 5 miles per hour were absorbed by the new freight wagon, while impacts at higher speeds were correspondingly reduced.

Permeability of Polysulfide Resins

BECAUSE of its extraordinary stretching properties, rubber has long been used as a gas-retaining material. Since the day in 1783 when Charles and the Robert brothers released in Paris a small balloon constructed of taffeta coated with rubber, this material has been the most widely used to construct lighter-than-air craft. Rubber is not, however, an inherently impermeable material, as shown by the slow leakage of air from an inner tube of an automobile tire. This leakage, however, is of little importance compared to the losses which can occur in various types of balloons, gas envelopes, ballonets, and gas cells.

Here are encountered the combination of several thousand square yards of fabric, coated with films which may be five- or six-thousandths of an inch thick, required to contain hydrogen or helium, both of which gases permeate rubber more rapidly than does air. The escape of lifting gas and, at the same time, the dilution of the gas within the structure by air leaking in, are of greater consequence in large airships of the rigid type than they are with small ships or balloons. Modern ships of the Zeppelin type have a gas volume of over 6,500,000 cubic feet.

The property of elastic extensibility is not confined to rubber alone. One direction of expansion of the plastics industry has been the development of materials which bear little or no relation chemically to rubber but possess a rubber-like elasticity at normal temperatures. (Such as Thiokol).

These resins differ from rubber in that they show marked resistance to gasoline and oils, which readily swell and weaken the structure of rubber. That a relation may exist between solvent resistance and permeability to gases is indicated, not only by the behavior of the organic polysulfide resins, but also by that of compounds containing polychloroprene, which as Neoprene is well known as a rubber-like plastic possessing resistance to solvents. The permeability to hydrogen of this material is much less than that of rubber.

The comparative behavior of rubber and the organic polysulfide resins, respectively, can be shown by a concrete example. The permeability of a film is customarily expressed in terms of volume, area, and time. A closely woven cotton fabric coated with an organic polysulfide resin to the amount of 3 ounces per square yard will allow hydrogen to permeate at the rate of about 0.01 cubic foot per square yard in 24 hours. A fabric having the same weight of coating of rubber will have a permeability of nearly 70 times that of the synthetic material.

Aside from the facts that balloon fabrics coated with organic polysulfide resins possess the characteristic of rubber-like flexibility and have a low permeability to lifting gases, they present a distinct advantage over fabrics coated with hydrophilic colloids, such as goldbeaters skin and gelatine, highly hygroscopic substances, in that they are not subject to great variations in weight with changes in atmospheric humidity.

The reason for the low permeability of these resins can be surmised only in a general way. Possible explanations are contained in a paper by Theron P. Sager in the August, 1937, issue of the *Journal of Research*, published by the National Bureau of Standards. In these substances the sulfur atoms are enormously large compared to the other constituents of the molecule. Assuming that they possess a chain structure, they are in effect linear polymers of sulfur atoms. If the passage of gas through the material is simply filtration through intermolecular spacings the low permeability of these resins might be attributed to a high structural density.

Should Restriction Be Renewed?

A Review of the Current Restriction Scheme, Its Accomplished Objectives, and a Discussion of the Probabilities of Renewal

ALTHOUGH the current rubber restriction scheme, which became effective June 1, 1934, does not officially expire until December 31, 1938, comment on the question of its being renewed is already rife, and discussion is keen in producing, manufacturing and shareholding circles. When the restriction scheme became effective crude rubber was selling at approximately 12½ cents. It has since touched 25 cents per pound and is currently quoted around 18 cents. It is generally conceded that the signatory countries have accomplished their prime objectives, i. e., reduction of stocks, regulation of production closer approximating demand, and an equitable price. Are all of the signatories content now that this has been accomplished? Are producers, manufacturers and shareholders finally in agreement? Can the gains attained be maintained? In short, should restriction be renewed? The following article, abstracted from the Far Eastern Survey, published by the American Council of the Institute of Pacific Relations, is an excellent treatise on the subject and furnishes many of the answers. (Editor).

RUBBER restriction under the current scheme ends with the close of 1938. Whether or not it will be continued, either in its present form or with some modifications, is a matter of concern both to those Far Eastern regions where the economy is largely based on the production of rubber and to the rest of the world where an industrialized civilization is increasingly dependent on this commodity. It is also a vital point of discussion along Mincing Lane, where the price of rubber rises and falls often with little apparent relation to the short-term supply or demand.

Without regard to the details of the restriction scheme, it would be a better than two to one shot to guess that some form of control will continue. The whole tendency of economic development seems to lead in that direction—trusts, national monopolies, international cartels, international governmental regulation. One commodity after another comes under the sway of international regulatory boards. That the attention of economists interested in international trends is more and more focused on this subject is attested by the increasing number of books and conferences which make it their central theme.

That rubber is peculiarly subject to regulation may be seen from the fact that even the fiasco of the Stevenson Plan did not prevent a new control system from being introduced. Has the International Rubber Regulation Committee proved more successful? The answer is dependent upon another question: What makes for success in a restriction scheme? And here reply waits upon the point of view. Who is to judge of success? The chairman of the board of directors of a rubber plantation who hopes to announce an extra dividend? The rubber goods manufacturer who wants to buy his raw materials at a low rate? The consumer who risks a blowout if he cannot afford a new tire? The native laborer who goes unhired if the acres out-of-tap increase? Or the dealer-speculator whose existence is threatened by a too stable price level?

To arrive at a synthesis of these different interests is well-nigh impossible. Moderate satisfaction and not too vocal discontent is probably all that can be expected. And this omits consideration of those to whom restriction is anathema as a matter of principle—both those who are irrevocably wedded to the creed of *laissez faire* and those who advocate planning production for consumer needs without regard to profit.

Rubber's Ups and Downs

When the International Rubber Regulation Committee set to work in 1934, it was with the announced intention of attempting some solution for the producer-consumer contradiction. It was hoped that some compromise might be reached without the costly time-lag in the interplay of supply and demand apparently inherent in the conditions of modern commerce. In this attempt the past history of rubber was both help and hindrance, containing as it did a well-remembered drop of prices which brought producers of crude rubber clamoring to their governments for help, and also encompassing Midas days when the latex trickling from the trees was so much liquid gold.

The most outstanding feature of the ill-fated Stevenson Plan and what doomed it to ultimate failure was of course the fact that its operation was restricted to planters under British control. An additional detrimental factor was inelasticity, with a pivotal price and a strictly graded increase or decrease of export percentages. Lasting six years, the life of the plan was terminated by order of the English Prime Minister in November, 1928, after it had been demonstrated that the committee in charge had lost control of the price.

The Stevenson Plan had aroused considerable antagonism among the largest group of consumers. The American rubber manufacturers and their government had become particularly incensed as the plan took on more and more an aspect of monopoly manipulation. As American consumers sought means of self-defense, a new impetus was given to the use of reclaimed rubber, which already furnished a considerable share of American consumption.

Closely following the end of the Stevenson Plan came the catastrophe of 1929. American demand for rubber diminished and it soon became apparent that here was a crisis of a special sort. Rubber stocks rose and the price sank steadily. British attempts to persuade the Dutch into a restriction scheme were of no avail in the face of the latter's belief that they would be unable to control native production with its hundreds of thousands of individual producers. At the end of 1932, the price reached an all-time low—3 cents a pound—and during 1933, negotiations for restriction began again, ultimately resulting in the inauguration of the current plan on June 1, 1934.

The new scheme covered between 95% and 100% of world production, having as it did the participation of Malaya, Netherlands India, Ceylon, India, Burma, North Borneo, Sarawak, Siam, and Indo-China. The last named is not, however, on the same quota basis as the other countries, and Siam also is on a special footing.

New Plan on Broader Basis

Composed of representatives of each participant with votes apportioned on the basis of one for every 1,000 tons of the basic quota, the International Rubber Regulation Committee set out with its purpose formulated in the following words: "to regulate the production and export of rubber in and from producing countries with the object of reducing world stocks to a normal figure, and adjusting in an orderly manner supply to demand, and maintaining a fair and equitable price level which will be remunerative to efficient producers." With this somewhat vague aim, a plan was set on foot which by its comprehensiveness and flexibility promised better results than its predecessor. No pivotal price was fixed; the percentage of permissible export could be changed at any time and for any amount. Quotas were determined on bases of several years' production, new planting was forbidden and replanting was limited to 20% of the planted area. An advisory panel was also provided to represent the consumers.

The position of the I.R.R.C. has at no time in its three years of existence been an altogether enviable one. Considered merely as the least of many evils in the beginning, it has served as a whipping-boy for all concerned with rubber. At the present moment, however, it is enjoying a modicum of praise at least from the producers and owners of rubber stock as company reports show increased earnings and doubled dividends. But even this popularity is colored by the criticisms of those who have forgotten the days of 4 and 8 cent rubber, and who cry for 18 cents a pound when the price is 12 cents, and for a quarter when the 18 cents has been obtained.

Stocks Fall, Prices Rise

How actually has the position of rubber changed? In brief, stocks have sunk from 649,700 long tons at the end of June, 1934, to 448,000 on March 30, 1937, and the price has risen from 12½ cents (average for the month) when the scheme began to the present level of slightly over 18 cents. A rapid increase in demand beginning in 1936 has been survived with nothing worse than a temporary price boom passing 25 cents a pound in the Spring of this year. What has the Committee had to work with?

The basic quotas fixed for the producing countries were originally as follows: Changed though they have been in some cases, still they give a picture of the relative importance of the main participants in the restriction scheme.

(in long tons)

	1934	*1935*	*1936*	*1937*	*1938*
Malaya	504,000	538,000	569,000	589,000	602,000
Neth. India	352,000	400,000	443,000	467,000	485,000
Ceylon	77,500	79,000	80,000	81,000	82,500
India	6,850	8,250	9,000	9,000	9,250
Burma	5,150	6,750	8,000	9,000	9,250
N. Borneo	12,000	13,000	14,000	15,500	16,500
Sarawak	24,000	28,000	30,000	31,500	32,000
Siam	15,000	15,000	15,000	15,000	15,000

Indo-China has been granted a special arrangement, which roughly amounts to no restriction unless production exceeds 30,000 tons. Trade circles did not expect that this output would be reached, at least not until 1938. Last year, however, saw an export of 40,829 tons of crude rubber from Indo-China.

The basic quotas fixed by the Committee with reference to existing production, and the apportionment of this quota among the various producers of a territory by the government thereof, have been periodically questioned and in some cases revised. Siam started the movement in this direction, when its legislature refused to ratify the restriction plan unless its quota were increased to 40,000 tons. In view of the strategic position occupied by that country for smuggling rubber into the Malay States, the retention of Siam in the agreement was considered to be worth a concession and the quota was raised as asked. India and Burma also won small increases in their original allotments. Both North Borneo and Ceylon have asked for raises, but so far to no avail. The former based its demand on the contention that its government miscalculated when asking for the original quota, and Ceylon pointed out that its quota is lower than its standard production. (Standard production of a territory is the sum total of production quotas assigned to its individual producers.)

It was estimated early this year that 52% of Ceylon's rubber acreage was in the hands of European estate owners. Inasmuch as some of the most fertile rubber areas are in the hands of natives, it has been intimated that the European representatives of Ceylon on the I.R.R.C. have not pushed Ceylon's case with sufficient vigor.

Discrimination Against Natives

This charge of discrimination on the part of colonial administrations in favor of the European planter is raised in various connections. In British Malaya, where all holdings—European and native—have been assessed and export licenses issued on the basis of such assessment, the charge periodically occurs that the estates are over-assessed and that the native holdings are under-assessed. One observer states that "inasmuch as the natives have had no spokesmen of any influence, nor records by which they could prove their case, nothing has been done." The relation of production between the two types of ownership in 1936 was 233,112 tons for the estates and 131,857 for the native holdings.

The problem of native planting has been most acute in Netherlands India. Phenomenal estimates are given of what the native holdings could produce at full capacity, and the situation has been intensified by an inadequate system of government control. When restriction began, it was decided that the division of the total permissible exports from the Islands between the estates and the natives should be determined on the ratio of the amounts exported in 1929—100:71.5, the larger share going to the estates. The licensing system of restricting exports was used for the European plantations and for a section of the natives, but the large majority of the latter were restricted by taxation.

For the first year and a half of the export scheme the government of the Indies struggled valiantly to keep down the native output, but despite the raising of the special export tax to an amazingly high level, native production continued to be in excess of the permissible amount. Toward the end of 1935, the government appropriated funds from the proceeds of this tax to buy up estate rubber licenses amounting to 20,000 metric tons, in order to keep the exports from the Indies within the allotted size. About the same time Netherlands India requested and was granted an increased basic quota in order to aid in dealing with native production. The new quota was fixed at 500,000 tons for 1936, 520,000 for 1937 and 540,000 for 1938.

The main difficulty with the taxation scheme had been that in some areas the natives depended on the sale of their rubber for subsistence and consequently increased their output as their returns decreased. It became apparent that it was necessary to undertake the enormous task of registering rubber trees owned by the native producers so that a system of individual

restriction might be applied. This was finally accomplished and the new system went into force on January 1, 1937. During 1936, thanks to the increased quota, which was applied entirely to native production, thus bringing the export ratio up to 100:93, and thanks to a continued strict application of the tax, native output no longer exceeded the permissible level.

Early this year the former situation was reversed with the changed system of restriction and with the changed world picture. The selling of license coupons which had been issued to the native producers threatened for a time to divert their attention from rubber production, which was by now urgently needed to meet the increased world demand. It was feared, moreover, that the tremendous increase in the income which the native producer obtained from his rubber would cause him to limit production. In order to increase native output, the district quotas have been considerably revised. Originally determined in order to place the largest production in the regions where the natives are totally dependent on rubber, they are now fixed more in conformance with the district's producing potentialities. On the whole it may be said that the crucial question of Netherlands India native rubber production has been solved, at least in so far as it is under control. If the current belief as to the inadequacy of estimates of native production capacity is well founded, it may be necessary to increase the native quota.

Above these conflicting interests of country and country, of foreign planter and native, as they struggle for the gains to be won from rubber, has stood the I.R.R.C. In its endeavor to bring down the alarmingly high stocks and to raise the price to a level permitting a moderate profit for the producer, the committee gradually reduced the permissible export percentage from 100% in June and July of 1934 to 70% at the end of the year. Raised to 75% in the first quarter of 1935 at the insistence of the Dutch in an effort to control native production, it was lowered to 70%, 65% and 60% for the succeeding quarters of the year. The end of its first year of work saw if anything a worse situation than when it began. Stocks in June, 1935, represented 8.47 months' supply as opposed to 8.27 in June, 1934, and the price of rubber was slightly lower. The end of 1935, however, showed a slight improvement in stock position and rising prices.

World Demand Raises Price

The year 1936 brought a break and reversed the trend with which the Committee had to cope. By the end of March, stocks had been lowered to less than seven months' supply, the price had risen further, and there was a growing demand. The 60% rate for permissible exports for the first half of the year was raised to 65% for the second half to an accompaniment of dwindling stocks and an increasing price which advanced from 14 cents in January to an average of 18½ cents in December. Rubber consumption in 1936 was over a million tons, and despite the announcement of an export allowance of 75% for the first quarter of 1937 and 80% for the second, a modified boom was on. Although the labor troubles in the American automobile industry restrained consumption, the low level of stocks and the fear that there would not be enough rubber later in the year forced prices up.

The question that arises is whether 18 cents or 20 cents a pound for rubber is more than a price which is "fair and equitable" and "which will be remunerative to efficient producers." The general producer satisfaction with restriction, and the profit showing of the recent company reports based on a period during most of which prices were at a lower level, would arouse suspicions that such is the case. In Malaya, it has been estimated that costs last year averaged around 13 cents (Straits) a pound f.o.b. whereas the Singapore price for the year averaged 27 cents. Another estimate made early in 1936 stated that a fair price would be 16 cents a pound with restriction and 12 cents without. Still another estimate gives 13 cents as a fair price with 75% permissible exports and 11 cents with 100%. No one knows what the Committee considers a fair price and where it is presumably trying to level off the price, but opinion would seem to focus around 18 cents. The question of producing efficiency is of obvious importance in this matter.

American Consumers Dissatisfied

Whether the consumer is satisfied with the way the I.R.R.C. has regulated affairs during the last year is another matter. The peak prices early this year brought forth scathing comment. Certainly the consumer has little voice in directing events. The consumers' panel mentioned earlier has not worked out satisfactorily. As one commentator describes it, "the consumers' representatives have never been given a vote, have not been able to participate very effectively, and it cannot be said that the experience has been satisfactory from their standpoint or from the standpoint of consuming interests." Representations have been made by the United States government and the Rubber Manufacturers' Association to the British and Dutch governments and influential private interests concerning the trend in rubber since the spring of 1936, and some people attribute at least partly to this influence the increase which has been made in the rubber releases. Many feel, however, that the increases were not great enough.

In defense of the I.R.R.C. it must be noted that there is a third element in the picture which not only confuses the issue but often seems definitely to provoke disequilibrium. The reduction of short-term price fluctuations lessens the possibility of speculative gain, and it is even contended by dealers that too steady a price level would drive them out of business. It is therefore not surprising that any possible surmise, rumor or doubt is seized upon and played to the limit. When the I.R.R.C. raised the quota for the third quarter of 1937 in March, their action was at once interpreted as showing that the chances of the exporting regions fulfilling their quotas were so slight that the Committee considered it futile further to raise the quotas for the second quarter.

Speculation Disturbs Market

How the market might have reacted if the Committee had drastically increased permissible exports for the end of last year, jumping from 60% to 80% or 85%, is hard to predict. The likelihood is that there would have been a sudden drop in prices upsetting to the producers. Moreover an orderly progression in increase and decrease is almost essential for estate production with its imported labor supply. An announcement of the I.R.R.C. on January 26, 1937, stressed so greatly the relation of supply to demand and so obviously ignored the price level that it was interpreted by some as being a disclaimer of responsibility for rubber prices so long as the statistical relations of the commodity were correct. By implication it could be considered as a refusal to estimate speculative demand, which is often so hysterical in its reactions as to make a very poor algebraic quantity.

The Committee, however, remains a producers' control with producing interests inevitably foremost in its consciousness. Its work and the results accomplished

cannot be the same as if consuming countries and industries had equal representation and equal voting power on the board. Whether a committee so constituted could survive many sessions is an open question. Also dubious is the effect such a consolidation of power might have on the ultimate consumer—the purchaser of rubber goods. It is conceivable, however, that at some future date a controlling board might be so composed. As it is, the large consuming interests remain on the defensive, ever apprehensive that the virtual monopoly control of production will result in a zooming price. In this connection it may be observed that the consumer interest in this field is better protected than in others owing to the fact that the principal buyers of crude rubber are large industrial concerns well equipped to defend themselves against monopoly prices.

The producer-consumer conflict is undoubtedly heightened by its coincidence with national divisions. Despite American and Japanese-owned plantations in the rubber regions (latest figures place Japanese investments in southeast Asia at 84,000,000 yen in 1933, approximately $24,360,000 at the current rate of exchange), despite increasing production in French Indo-China, still the world's rubber is predominantly produced by subjects of the British and Dutch empires, and its growth in their territories constitutes a strategic monopoly whose importance is well recognized both by those who enjoy it and by those who are excluded from its benefits. This fact gives additional impetus to the search for substitutes and to the development of new rubber-growing regions.

Advocates of diversified regional economy might also be in favor of a thinner and more extensive spread of rubber production throughout the world. Malaya with its eggs in the two baskets of rubber and tin, Netherlands India where the rise and fall of rubber prices directly affects purchasing power over large sections, might well be more secure if the profits and losses of producing rubber were more widely shared by other regions. As it is, these countries remain singularly vulnerable to the misfortunes of this commodity.

Hazards of Regulation

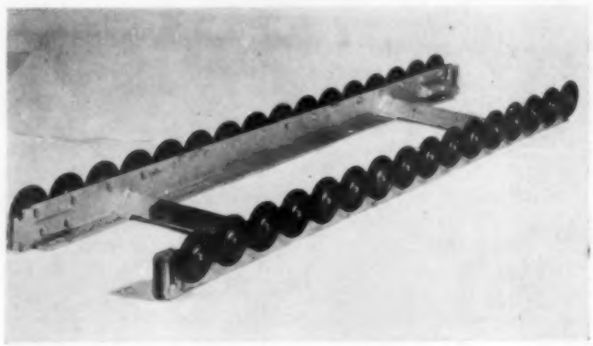
The magnitude of the stakes in the success of the I.R.R.C. might well frighten that body. And even though it has, to all appearances, functioned better than its predecessor—even though it should survive the change from surplus stocks and low demand to a thin stock cushion and high consumption with nothing worse than this spring's price advance, it still would seem, from the broad economic viewpoint, a rather one-sided and hazardous method of regulating a commodity whose fortunes may have such widespread repercussions. Nevertheless, while important modifications may be made in the mechanism of rubber regulation, it is difficult to conceive, in the present trend of world economy, of any material relaxation in the effort to keep this important commodity under some form of international control.

To Owners of Noble's "Latex in Industry"

The author has prepared an addenda and errata list which represents not only errors in patent numbers and typography but which includes a number of references originally omitted from the book. This list, in printed form which may be readily pasted into the original copy, is available without cost to all purchasers of the book. Address requests to THE RUBBER AGE, 250 West 57th Street, New York City.

Rubber-Tired Wheel Conveyor

ONE of the recent anti-friction products developed by the Mathews Conveyor Company, Ellwood City, Pennsylvania, is a rubber-tired wheel conveyor said to be practical for many different applications. When the wheels are mounted in light frames they become an excellent conveying surface for shingles,



steel sheets, glass or other fragile objects which must be guarded from jarring or scratching. Rubber-tired conveyor sections are available straight or in any practical degree of curvature, with detachable or fixed couplings where portable or stationary conveyor sections are used.

The wheels are of pressed steel construction, having hardened steel inner and outer ball races. Two sizes are available, with rated capacities of 20 and 50 pounds, respectively. The rubber tire is steamed into place on the wheel. It contracts upon drying and fixes itself solidly on the wheel. The inside of the tire fills the groove between the wheel flanges, holding the tire firmly in place. Although primarily intended for conveying, these special wheels lend themselves to other applications, such as on tea wagons, light dollies, infant strollers and toys.

Carbon Black from Anthracene

ABOUT eighteen months ago Germany began the production of carbon black from naphthalene in an effort toward securing independence in its carbon black requirements. Early reports stated that German chemists were successful in synthesizing a product from this method that was equal to many good grades of carbon black. Continuing its efforts in this direction, Germany has started the production of carbon black from anthracene, a coal-tar derivative, according to the Chemical Division of the Department of Commerce, Washington, D. C.

It is believed that the German government turned toward experimenting with anthracene for carbon black production because the use of naphthalene was found to be considerably expensive, owing to its scarcity and the heavy demand for the material from other industries. In 1936 it was reported that Germany was producing naphthalene black at the rate of 12,000 metric tons per annum and that the domestic product was rapidly replacing imported brands. In fact legislation was passed requiring the use of naphthalene black in certain products, particularly automobile tires.

It is not known at present to what extent anthracene black is being used but it is reported that a group of leading tire manufacturers are experimenting with it and will adopt it to the exclusion of all other blacks if the experiments prove successful. The Russwerke Dortmund factory has already adopted the new black.

Rubber Industry Shows Gains

Dun and Bradstreet Survey Indicates Eight-Year Highs in Half-Year Totals for Most Divisions of the Trade

HALF-YEAR totals for both production and distribution in most divisions of the rubber industry moved up to an eight-year high, according to a survey by Dun & Bradstreet, Inc. Although production of automobile tires started downward in April, and by June was under last year's rate, at the majority of plants schedules were unchanged.

For the first time since 1928, an increase in replacement tire sales over the preceding year's is indicated. Trade estimates have set the 1937 total at 31,200,000 tires, as compared with 29,700,000 in 1936, an increase of 5.1 per cent. As the estimate for original equipment, however, has been stepped down to 25,000,000 tires, the total 1937 automobile tire production will be lowered to 56,200,000 units, a decline of 3.3 per cent from the 1936 production of 58,116,000, as compiled by the Rubber Manufacturers' Association, Inc., and the first drop since 1932.

Even should the current tense labor situation in the tire division reach a crisis, when planned large-scale lay-offs start, the closing of all plants by a strike for the remainder of 1937 would cause no inconvenience to either automobile producers or users. At mid-August inventories were the largest on record, plants holding around 12,500,000 units, dealers about 7,000,000, and automobile manufacturers 3,000,000.

Larger Production Total

Reduction of operations in many divisions of the industry, which started in June, did not prevent production for the first six months from surpassing that of 1936. Renewed activity of idle equipment and long-needed repairs and replacements by heavy users bolstered output of industrial rubber products from 20 to 50 per cent above last year's. In some lines of belting, packing, washers, and insulating materials, the comparative gain exceeded the top range. On rubber novelties, office specialties, footwear, and coats, many factories were booked months ahead.

Production of automobile tires (casings) kept ahead of last year's monthly rate until June. After rising to 5,916,000 units in March, the largest monthly total recorded since June, 1933, the subsequent decline reduced the June, 1937, output to 5,339,000 units, a drop of 4.9 per cent from the 5,612,000 in June, 1936. Total for the six months, however, went to an eight-year high at 32,563,000, more by 19.5 per cent than the 27,241,000 for 1936, but less by 21.9 per cent than the 1929 comparative of 41,701,000.

Shipments of automobile tires (casings) of 30,991,000 units went 12.8 per cent over the 1936 half-year total. This set an eight-year high by going ahead of preceding periods back to 1929 at 37,824,000. Despite this gain, inventories of 12,528,789 tires on July 1 were at a seven-year peak for that date. Up 59.9 per cent from 1936, this number was 20.8 per cent larger than the ten-year average, 1927-1936, of 10,372,700 tires for July 1.

Use of crude rubber thus far in the current year has widened from the peak total of 573,522 long tons for 1936, which was up 16.7 per cent from the previous high of 491,544 in 1935. Rising since January, consumption of 54,064 tons in March was the largest for any month on record. The irregular downtrend that followed left the 51,798 tons in June 1.8 per cent under the 1936 figure, while July dropped 9.5 per cent below it at 43,650 tons.

Despite the reduction in June, which was the first year-to-year decline since February, 1936, and its extension in July, consumption of crude rubber for the seven months of 1937 reached a new peak. The total of 352,068 long tons, as compiled by the Rubber Manufacturers' Association, Inc., was 6.3 per cent larger than the 1936 all-time high of 331,356. It was 21.9 per cent above the 1935 seven-month period, and 51.8 per cent over 1933 at 231,879.

Constant monthly reductions since February, 1935, lowered world stocks of crude rubber on June 1, 1937, the third anniversary of the current rubber restriction plan, to 462,637 long tons. The latter compared with 707,172 on June 1, 1934, according to the Commodity Exchange, Inc. Of the world stocks on June 1, 1937, the United States held 37.4 per cent, as against 29.8 on June 1, 1929.

On most grades of industrial and commercial rubber products, wholesale quotations have been unchanged since the 10 per cent mark-up on April 1. The latter followed an advance of 7 to 10 per cent on January 1. Due to the stronger co-operative efforts of the various manufacturers, disturbing price-cutting practices nearly have been eliminated.

Manufacturers of tires have held prices steady since March 13, when a rise of 6 per cent succeeded a similar one on January 18. A slight increase is imminent, however, on third-line tires. Now selling for about 37 per cent less than first-line tires, it is believed that the removal of this discrepancy would accelerate sales of other grades.

Downtrend of crude rubber quotations is expected to cause no lowering of prices on finished products. On March 31, crude rubber (standard thick latex) brought 30 cents a pound at New York, a gain of 89.1 per cent over the 16⅛ cents a year earlier. By August 30, it had moved down to 19⅝ cents.

Only One 77-B Case

An application filed on April 16, 1937, by a manufacturer of rubber footwear for reorganization, under the provisions of Section 77-B, was the first one recorded for the rubber goods industry since April 2, 1936. With 1 thus far in 1937, only 11 cases have been listed since June 7, 1934; 3 of these were in 1936, 4 in 1935, and 3 in 1934.

Failures in the rubber goods industry also virtually have been brought to a halt this year. For the first seven months the 4 bankruptcies for manufacturers contrasted with 10 for the twelve months of 1936, while the 7 for wholesalers and retailers was less than half the 16 for the full year of 1936. This reduction extended the constant annual downtrend since 1931, which set a peak at 233.

Flash Curing of Rubber

THE vulcanization of rubber is generally accomplished by means of a definite heat treatment wherein the material is heated at a closely controlled temperature for a carefully measured length of time. This curing procedure is more or less standardized and few deviations are permitted in rubber factories. To maintain the desired degree of vulcanization, automatic temperature and time controls are usually employed.

Nevertheless, the temperatures employed in curing rubber compounds are not specific, according to an article in the July, 1937, issue of the *Industrial Bulletin of Arthur D. Little, Inc.*, which states that as a general rule a different temperature may be employed without a change in quality, providing an appropriate change in the time of heating is made. This time-temperature relationship is complex and cannot be calculated reliably by mathematical methods, because vulcanization involves chemical, colloidal and physical changes which perform at differing rates with variations in temperature.

However, there is reason to believe that in the chief reaction desired an increase of 10° C. would approximately cut in one-half the time required for adequate vulcanization. These facts are not new and have been employed for very many years to increase the productive capacity of vulcanizing equipment.

With the introduction of organic accelerators, a marked decrease in time could be made without a change in temperature, but the general time-temperature relationship still applied, namely, — a further decrease in the time interval could be made by elevating the temperature. Nevertheless, the maximum temperatures employed for vulcanizing rubber were in the neighborhood of 170° C. in a few plants, and 163° C. was more often regarded as the practical higher limit of the temperature of vulcanization. At these and higher temperatures the effects of undesirable secondary reactions were often intensified to a degree which impaired quality.

Contrary to this tradition of the rubber industry, the Western Electric Company and the Bell Telephone Laboratories in cooperation have developed a process for vulcanizing the rubber cover on insulated wire at temperatures above 170° C. and up to 198° C. At the latter temperature a cure is effected in less than twenty seconds as against twenty minutes at 142° C. To accomplish this a high degree of organic acceleration is employed. The advantages claimed are not restricted to speed. In addition, the distortions during processing of the weak, plastic mass, characteristic of unvulcanized rubber compounds, are avoided, a more uniform mechanical and electrical product is obtained, and the desired chemical properties are retained.

The process is not applicable to all rubber vulcanization, but it may be extended to some classes of rubber products. Among the principles involved are the absence of compounding ingredients appreciably volatile at the temperatures employed, sufficient heat conductivity of the mixture obtained by compounding or by limited thickness of the rubber, a mechanically dense non-porous rubber compound, and adaptability to a continuous curing process.

From these considerations the process appears to be applicable to the manufacture of tubing, some grades of packing, thin sponge rubber sheets, rubberized fabrics, vulcanized sheet rubber, and other similar uses. Employing these principles, the vulcanization of latex could be carried out as a continuous process by modifying details so as to adapt the process for the handling of liquids at temperatures below those required for dry compounds, but above those now employed in the batch method. The Western Electric-Bell Laboratories' process thus reveals a new principle in rubber technology.

Rubber Peptizing Agent No. 2

FURTHER experiments in the softening of crude rubber by chemicals in the laboratories of the Rubber Chemicals Division of E. I. du Pont de Nemours & Company, Inc., Wilmington, Delaware, which originally led to the development of RPA No. 1, a peptizing agent, has now resulted in the development of another type of peptizing agent, which has been termed RPA No. 2, and which is said to be more effective and economical than the first material. RPA No. 2 is composed of 33 1-3% naphthyl-beta-mercaptan and 66 2-3% inert hydrocarbon. It is a white, waxy material which has a specific gravity of 0.94 and which begins to melt at 50°C. Its storage ability is said to be good, but the material should be kept away from heat for obvious reasons.

RPA No. 2, according to DuPont engineers, enhances the softening of crude rubber during mastication, does not require heat after-treatment, shortens milling time, increases the capacity of rubber processing equipment, improves processing properties of unvulcanized rubber compositions, and is effective in small amounts. It is said to soften rubber without causing deterioration through swelling or "lubrication" and to be effective in the presence of pigments and fillers often eliminating pre-mastication since it can be used simultaneously with these materials in the mixing operation.

Instrumentation at the Gillette Factory

(Continued from page 366)

of steam to the unit heaters by means of temperature-recorder controllers, as is also the admission of steam to the heating coils in the festoon dryer.

Steam pressures are uniformly maintained by means of dependable pressure controllers installed in the drying drums and cans in the web fabric room and all dryers are equipped with recording thermometers. Hundreds of indicating thermometers are also used in the plant to check recording thermometers, controllers and recorder-controllers. In fact, wherever one of these automatically functioning instruments is installed, at least one checking indicating thermometer is provided. In connection with press operations and those of drying drums and cans, indicating thermometers are located at strategic points for checking all critical temperatures, so that at a glance air-bound and water-logged drums or cams may be detected in the drying machine.

In the water heater station, every precaution has been taken to guard against mishaps — duplicate heaters, pumps, controllers and diaphragm valves being installed — so that the system of automatic cycle controllers becomes in effect the key to competitive manufacture. Instrumentation has eliminated alibis, since blame for under-cures, over-cures, rejects and inefficient production in general can be definitely placed. The trained technician selects the materials that make up the rubber compound and provides the proper temperature-time schedule for the formula. It then develops upon the production manager and the dependable cycle controllers to carry out the program.

New Equipment

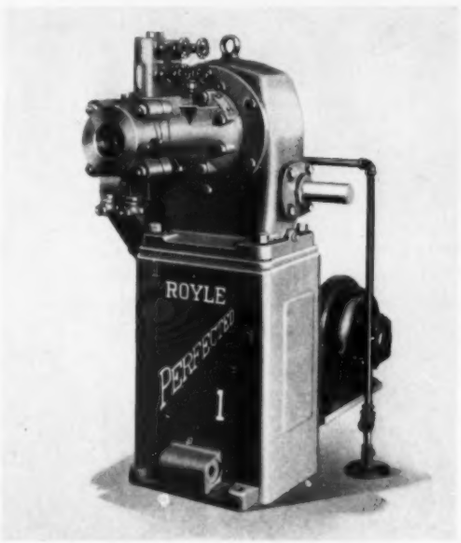
Tilting Head Molding Press

AN IMPROVED tilting head molding press has recently been developed by the Baldwin-Southwark Corporation, Philadelphia, Penna. The head of the new press, which is especially intended for molding thermoplastic materials, is hydraulically actuated backward and forward in a horizontal plane by rams. The head rotates through an arc of 90°. These movements are under control, and are readily adjustable from any desired position to the maximum. Special attention was given in the designing of the head to prevent deflection thus eliminating the possibility of poorly-pressed pieces with heavy flash fins made in the center cavities of molds. Due to this construction, the press handles larger size molds than heretofore possible. The head is balanced, which is said to eliminate the moving of a heavy mass from a vertical to an angular position with its accompanying racking impact when arrested. This feature permits the construction of presses of

high tonnage and large platen areas. The head is also fitted with an hydraulic push-and-pull ejector that works independently of any other part of the press, permitting the ejection of the pressed product at any point of the platen stroke or head position. The strokes of the ejector can be adjusted from zero to maximum, and the press can be equipped with either top or bottom ejectors, or both. The bottom platen is designed to prevent deflection and is of the moving-up type. A substantial base is provided with the new press which extends to the back, making a platform on which steam headers and the like may be fastened. The base and the press side frames have no pockets in which refuse can accumulate. The side frames are provided with stops which prevents over-stroking of the main rams. The main cylinder and the push-back cylinders are not cast integral with any part of the press, and consequently they may be provided in any size to give the required press tonnage to suit existing line pressures in rubber and other factories.

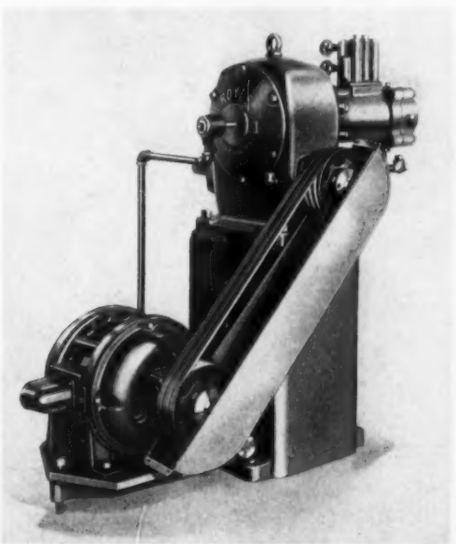
Royle Extruding Machine No. 1

DESCRIBED as being compact, modern and redesigned throughout, a new extruding machine, termed Perfected No. 1, has been developed by John Royle & Sons, Paterson, N. J. It is specifically intended for small size work in the field of druggists' and stationers' sundries, weather stripping, pen barrels, bead wire coating, electric wire insulation, and the like, although it is also adaptable for other uses, such as in the manufacture of casein and cellulose. Four



Front view, with standard tubing head.

different head types are available with the improved extruding machine, including the standard tubing head, soapstone tubing head, fixed-center side-delivery head and adjustable-center side-delivery head. The head section, attached by stud bolts at the forward end of



Rear view, upper half of belt guard removed.

the cylinder, supports and warms the die fixtures. The stock screw or worm is milled from forged steel. The pitch is progressively diminishing for standard require-

ments, which induces rapid intake of stock and high compression. Like other Royle extruders, the new machine has internal water-cooling. The steam-and-water jacketed cylinder is proportioned to withstand heavy pressures and provided with a replaceable bushing or liner. Continuous automatic feed from a warming mill is said to be practical and efficient. An automatic splash and gravity system carries oil to all working parts of the enclosed gear and thrust section. The stock screw shoulder bearing is lubricated with high temperature grease from a compression cup. An assembly of valves on top of the cylinder, facing the operator, controls a positive circulation of steam or water through the walls of the cylinder, and separately through the head surrounding the die. Water for cooling the stock screw enters and drains at the rear. Triple V-belts give a smooth, vibrationless drive from the motor to the enclosed gear unit. The motor base is adjustable for belt tension and reversible for front or rear drive. The new extruding machine is said to be far more compact than previous models, taking only 25 x 45 inches of floor space. The cylinder diameter is 2 inches, normal die range for tubing is from ¼ to 1 inch, and the gear reduction is 15-1 or other. The machine is 40 inches in height and weighs approximately 1,500 pounds without the motor.

Rubber Sheet Hydraulic Press

SPECIALLY designed for heavy tonnage and for accurate work on rubber sheets, an improved hydraulic press has been introduced by the A. B. Farquhar Company, Ltd., York, Penna. The new press has a tonnage of 2,500, is equipped with 42 x 42-inch platens, and has 10 openings. The ram diameter is 36 inches, columns are of 13-inch diameter, pressure is 5,000 pounds, pressure on a 40 x 40-inch surface is

3,000 pounds per square inch, and the combined deflection of top and moving platens is .006-inch. The cylinder is made of heat-treated alloy steel casting, and the moving and top platens, of heavy ribbed boxed sections, are also of cast steel. The steel steam plates are 3½ inches thick and are designed for 150-pound steam pressures. Suitable insulation is provided between the top and bottom steam plates and their respective platens to reduce radiation losses between ram and moving platen and to prolong the life of the packing. The ram is made of a special Farquhar material with 1½% nickel. A multiple split molded packing is used in place of the standard U-type packing. Generous collars are applied on the tie rods to maintain rigidity of the press, and the columns are provided with shrunked-on nuts to assure good alignment under heavy and continuous service. The improved press is said to eliminate the necessity of sanding sheets to maintain uniform thickness, for when polishing plates are used the surfaces of the finished products are uniform.

Cellulosic Plastic Coating

A NEW type of cellulosic plastic coating, which can be applied either by dipping or spraying, and which is applicable to rubber, metal, wood and glass surfaces, has been developed by the Detroit Macoid Corporation, 12340 Cloverdale Avenue, Detroit, Michigan. "Macoid" is the name of the coating used for dipping; "Cellucraft" is used with a spray gun. The coating procured by either operation is said to be identical when cured.

Ordinarily, the parts to be coated do not require special preparation or surface treatment because the coating is flexible and has the property of shrinking tenaciously about the surface to which it has been applied. In the case of metal parts it is sometimes advantageous to Parkerize the metal or treat it with Lithoform. In dipping, a film thickness from .003 to .020 is secured with one dip operation. This is accomplished by the viscosity of the material and the speed through which the piece is moved in and out of the dipping tank. A film of approximately .0015 thickness is secured with the spray gun with each spray coat. The company recommends three coats, which builds up a film of .004 to .005, considered sufficient coat for a quality finish.

Both Macoid and Cellucraft may be pigmented to develop a variety of decorative effects and to any degree desired. Vivid colors, delicate pastel shades, brass, copper and gold effects may all be created. A pleasing transparency can also be obtained by using certain dye pigments or combinations. In regular opaque pigmented coatings the die casting does not have to be prepared in any way except to polish the fin or parting line from the casting. In their clear transparent state both coatings can be used to protect bright metal finishes.

The new cellulosic plastic coating is reported to have great mechanical strength, resistance to abrasion and wear, and resistance to weathering and chemical attack. It is said to have passed salt spray tests, wearing tests, rubbing, aging and temperature changes. It is impervious to gasoline, naphtha, oils, greases and chemicals for all practical purposes. It also has good dielectric and insulating properties and is described as being extremely stable and durable for exterior or interior use.

Dipping, spraying and curing takes place in ordinary room temperature, according to the company, with all parts air-drying in a short time, the average piece taking about thirty minutes. The company stresses the point, however, that Macoid (the dipping material) should only be used where a very thick coat or film is necessary, *i.e.*, .005 or over, since only one operation is necessary. For coating under this thickness the sprayable material should be used for economical purposes. Ordinary spray guns and spraying equipment can be used with Cellucraft, according to the manufacturers.

Book Reviews

Annual Survey of American Rubber Chemistry for 1936. By Webster N. Jones. Published by the Carnegie Institute of Technology, Pittsburgh, Penna. 6 x 9 in. 40 pp.

For a ten-year period (1925-1935) the "Annual Survey of American Chemistry" was published under the sponsorship of the National Research Council and was ably edited by Clarence J. West, director of the Council's research information division. Because of lack of financial resources, the Council discontinued its informational service and subsequently dropped its sponsorship of the annual survey. In order to insure continuity of the survey of American rubber chemistry, which was part of the N.R.C.'s annual survey, and with the hope that future publication will be resumed, the City of Pittsburgh sponsored the current study, which was edited by Mr. Jones, assisted by workers furnished by the Works Progress Administration. The current study follows the style of the former annual reviews. It discusses developments which occurred in 1936 in the fields of crude rubber, rubber chemicals, testing methods, reclaiming, latex and rubber dispersions, hard rubber, synthetic rubber, rubber derivatives, etc. A complete list of references is also included.

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Handbook of Chemistry. (Second Edition). Compiled and edited by Norbert Adolph Lange. Published by Handbook Publishers, Inc., Sandusky, Ohio. 5½ x 8 in. 1802 pp. $6.00.

This second edition is larger than the first, has been completely revised and brought up-to-date, contains many new tables, and includes 250 pages of mathematical data which were compiled by Richard Stevens Burington, Assistant Professor of Mathematics at the Case School of Applied Science. Like the first edition, this volume is intended as a reference volume for all requiring ready access to chemical and physical data used in laboratory work and manufacturing. The book contains a comprehensive, cross referenced index. One section is devoted to the chemical resistance of rubber and to the physical properties of hard and soft rubber.

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Business Under the New Price Laws. By Burton A. Zorn and George J. Feldman. Published by Prentice-Hall, Inc., 70 Fifth Avenue, New York City. 6 x 9 in. 464 pp. $5.00.

The co-authors exhaustively treat with the economic and legal problems arising out of the recently enacted Robinson-Patman Act and the various Fair Trade and Unfair Practice laws by which industry is currently regulated. Particular attention is paid to the Robinson-Patman Act, the authors examining each section in detail and pointing out the "important places" at which the Act impinges on business conduct. They question the validity of the law at several places, especially on the issue of the privilege of meeting competition, and predict that the "narrow interpretation" placed upon this clause by various Congressmen will not be supported by the courts. The book has been written for the businessman as well as his lawyer, although it is not a legal textbook by any means.

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Modern Equipment for the Poultry Farm. By Alexander Hay and D. F. C. Vosper. Rubber Growers' Association, Inc., 19 Fenchurch St., London, E. C. 3, England. 5½ x 8½ in. 12 pp.

Number 7 in the series of bulletins prepared on the uses of rubber in agriculture, this one treats with various rubber-tired equipment and other rubber apparatus on poultry farms. Rubber-tired folding units for transportation of poultry, rubber-tired water carriers, motor mowers, carts, motor scythes, etc., are described and illustrated, as are rubber-lined nest boxes and rubber balance cups for egg-grading machines.

News About du Pont Rubber Chemicals. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware.

The July 1, 1937, issue of this new monthly house organ contained reports on the following subjects: Colored Rubber Running Boards, New Colors for Latex Products, Surface Treatment of Thin Dipped Goods, Non-Staining Stocks for Use with "Duco" and "Dulux", and du Pont Monastral Blues for Rubber. The issue dated August 6, 1937, contained these additional reports: Neoprene Compounding Principles (Report N-5), Neoprene Curing Method (Report N-6), Neoprene-Carbon Black Masterbatches (Report N-7), Footwear Compounding—Rubber and Neoprene (Report No. 202), and The Use of Peptizing Agents in Sponge Rubber (Report IR-4).

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Automobile Facts and Figures (1937 Edition). Published by the Automobile Manufacturers Association, Inc., 366 Madison Avenue, New York City. 6 x 9 in. 96 pp.

This latest annual statistical compilation compiled by the A.M.A. covers the calendar year of 1936. It includes figures on factory sales of automobiles, wholesale value of motor vehicles, parts and tires, foreign sales of American motor vehicles, car registrations in the United States, capital invested in car and truck factorties, total taxes on motor vehicle owners and information on employment and wages in this country. The figures show that 50,933,-710 balloon casings were shipped in 1936 as compared with 46,168,479 in 1935 and 41,413,699 in 1934.

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Neoprene—a Remarkable Engineering Material. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6 x 9 in. 24 pp.

This handbook considers separately the effects of various types of oils, acids, sunlight, heat and other forces which result in the deterioration of rubber products and indicates the type of service which may be expected with a similar part of neoprene, the company's generic term for its chloroprene rubber. Specific applications of neoprene products are described, with data given on reasons for the uses to which they have been put. A summary of the method of making neoprene together with a description of its chemical composition is also given.

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Rubber's Many Uses. By James Fairbairn. Rubber Growers Association, Inc., 19 Fenchurch St., London, E.C. 3, England. 8½ x 13 in. 4 pp.

This pamphlet, the major portion of which is reprinted from an article written by the author in the Rubber Supplement published by the *London Financial Times* on June 28, 1937, is devoted to the many applications to which rubber has been put, particularly in the fields of agriculture, building, transportation, mining and engineering, and in the development of roads and highways.

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Green Book Buyer's Directory (1937-38). Published by Oil, Paint & Drug Reporter, Inc., 12 Gold Street, New York City. 3½ x 8 in. 1004 pp. $1.00.

This annual directory, now in its twenty-fifth year, has been revised and extended. As usual, it contains sections devoted to Industrial Materials, Industrial Equipment and Professional and Technical Services. A new section has been added this year, *i.e.*, a list of Trade-Names and Brand-Names. This directory is of value to all buyers of chemicals, oils and drugs.

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"If I Only Had That Book." (Catalog No. 5). Chemical Publishing Company of New York, 140 Lafayette St., New York City. 5 x 8 in. 136 pp. 10 cents.

Revised and brought up-to-date, this catalog lists chemical, bacteriological, engineering, electrical, general scientific and other technical books of American and British publishers. Full name of book, author and price is given in each case. In many cases a few lines of descriptive material accompanies the listing.

Editorial Comment

Welcome, Detroit Rubber Group

THE dissemination of knowledge, particularly technical knowledge, is always helpful to industry. In the rubber trade this dissemination is secured through the medium of the trade and technical press, the twice-a-year meetings of the Rubber Division of the American Chemical Society, the various journals issued and sponsored by the A.C.S., literature issued by the chemical companies, and at the periodic meetings of the various groups of the Rubber Division. There are now rubber groups in Akron, Boston, Chicago, Los Angeles and New York. There is also the Rhode Island Rubber Club which operates independently. Now comes news of another group, the Detroit Group, Rubber Division, A.C.S., organized by rubber chemists and technologists in and around the City of Detroit. This territory, the automobile manufacturing center of the world, has long merited a group of its own. The recently-formed Detroit Rubber Group holds its first official meeting on September 29 at the University Club. Meetings will be conducted along the lines of the other rubber groups. Welcome, Detroit Rubber Group.

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The Miller-Tydings Act

ABOUT two years ago when the tire manufacturers for the first time in years mutually decided to do their utmost to avoid retail price wars the prediction was made that successful abolition of such tactics would result in increased profits. That prediction has come true, as witnessed by the recent financial statements of Goodyear, Goodrich, U. S. Rubber, Firestone, General and others. Now comes an opportunity to perpetuate the stabilization which has thus far existed in the price structure.

Several weeks ago, President Roosevelt signed the Miller-Tydings Price Maintenance Act, which was attached as a rider to a District of Columbia tax bill. The Miller-Tydings Act is really an amendment to the anti-trust laws of 1890 which were passed to "protect trade and commerce against unlawful restraints and monopolies." Price-setting then, as well as in later years, was regarded as a measure leading to monopolistic tendencies on the part of manufacturers and distributors. The economic picture of the past few years, however, has changed this opinion to a point where the legislators now consider such price-setting actions as an aid to better business—therefore, the Miller-Tydings Act.

Under the Act, manufacturers may legally contract with state distributors and retailers for minimum resale prices on advertised brands in those states where resale pricing is permissible. At this writing only six states (Alabama, Delaware, Mississippi, Missouri, Texas and Vermont) have not as yet passed such state laws. It is anticipated that these six states will also fall into line with "fair trade laws" by their next legislative sessions. It should be emphasized that the Miller-Tydings Act applies to contracts between producers and customers and distinctly prohibits as illegal contracts between competitors.

Undoubtedly, the minimum resale price law will have considerable reverberations in coming months. Nevertheless, it presents an excellent opportunity for tire manufacturers to assure non-interruption of the amicable relationship which has existed in the trade from a price angle for the past two years. It also presents an equal opportunity for other rubber manufacturers to stabilize their respective price structures, such as footwear and mechanical rubber goods.

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Labor's New Responsibility

IF decisive labor decisions, pro or con, are any assurance of elimination of labor difficulties, then the Goodyear and Goodrich factories should operate on continuous production schedules for years to come—providing that labor's victories do not go to the heads of labor's leaders. In other words, eligible Goodyear workers voted on August 25 by a margin of 8 to 3 (8,464 to 3,193) to select the United Rubber Workers of America as sole collective bargaining agency, and two days later, on August 27, Goodrich workers voted 10 to 1 (8,212 to 834) for the same agency. Both votes were conducted under the auspices of the National Labor Relations Board.

The weight of numbers in both cases augurs well for the industrial peace of Akron. Were the decisions by narrower margins, it is probable that neither management nor labor would have accepted them in full and future bickering would have been almost certain. Now, since both Goodyear and Goodrich consented to the holding of the elections to determine the sole collective bargaining agency, it is presumed that they will accept the U.R.W.A. as such, and proceed with negotiations that should result in mutually satisfactory agreements.

The decisions place a great weight upon the rubber union. It must now prove to itself, to the rubber manufacturers, and to the industrial world at large, that it is big enough to handle the responsibilities placed on it. It must prove that once negotiations are concluded (as they will be) it can extract obedience from its members to abide by contractural obligations undertaken in their name and behalf. The automobile union failed badly in this respect. Both the automobile and rubber unions are affiliated with the Committee for Industrial Organization.

CURRENT • NEWS
of the Rubber Industry

SEPTEMBER, 1937

Eleven Papers Presented at Fall Meeting of Rubber Division Held in Rochester, N. Y.

Over 300 Attend Technical Sessions—New Officers Are Named for 1937-38 Season—New Form of Entertainment Presented at Banquet Lauded—Business Session Held

THE ANNUAL Fall meeting of the Rubber Division, A.C.S., was held at the Powers Hotel, Rochester, N. Y., on September 8 and 9, with over 300 rubber technologists in attendance at the technical sessions and over 400 at the banquet. An excellent program, coupled with a centrally-located meeting place, combined to bring out an unusually large number of members and guests. Eleven papers were presented at the technical sessions, held on the afternoon of September 8 and the morning of September 9. (Titles and abstracts of all papers were published in the previous issue).

The only deviation from the scheduled program was occasioned by the fact that Mr. J. N. Dean, of the Telegraph Construction and Maintenance Co., Ltd., of London, England, was unable to attend, and his paper on the electrical characteristics of gutta-percha and balata was read by F. S. Malm of the Bell Telephone Laboratories.

Banquet is High Spot

The high spot of the meeting was the annual banquet held in the Ball Room of the Powers Hotel on the evening of September 8. Reports that an outstanding program of entertainment was to be provided created a great deal of advance interest and the 400 who attended were not disappointed. The show, following a cocktail hour and an excellent dinner, was acclaimed as the best ever put on by the Division, and the Entertainment Committee was congratulated on the success of its departure from previous forms of entertainment. Instead of the usual table favors, complemented by a short show, the Committee used all of the funds donated by various suppliers to provide a longer and more diversified type of floor entertainment. The change was well-received, if the applause and comments were any indication of the sentiments of those present. In addition to a number of well-executed chorus routines, the entertainment consisted of 16 acts of dancing, magic, comedy, songs, jugglers, etc.—all introduced by a master of ceremonies.

The Entertainment Committee in charge of the dinner and show consisted of Verne Smithers, chairman; Enos Baker, treasurer; and H. E. Elden, Art Kempel, Jack Hamilton, and Harry Seaman. The list of supply firms who contributed to the entertainment fund follows: Akron Standard Mold Co., American Zinc Oxide Co., Binney & Smith Co., Godfrey L. Cabot, Inc., Columbia Alkali Corp., Continental Carbon Co., E. I. du Pont de Nemours & Co., General Atlas Carbon Co., General Dyestuff Corp., C. P. Hall Co., Keystone Filler & Mfg. Co., Midwest Rubber Reclaiming Co., Rubber Service Laboratories Division of Monsanto Chemical Co., Naugatuck Chemical, N. J. Zinc Co., Pequanoc Rubber Co., St. Joseph Lead Co., Titanium Pigment Corp., United Carbon Co., R. T. Vanderbilt Co., C. K. Williams & Co., and Wishnick-Tumpeer, Inc.

At the business meeting, held following the final technical session, the result of the election of officers was announced and is given elsewhere on this page.

On the celebration of the 100th anniversary of the discovery of vulcanization by Charles Goodyear, the chairman was authorized to appoint a committee to handle the necessary arrangements for such a celebration, to be held in conjunction with the Fall, 1939, meeting of the Rubber Division, in Boston, Mass.

The Committee on Arrangements for the I.R.I. International Technological Conference in London in May of 1938, urged through its chairman, Dr. A. A. Somerville, that all who desired to attend so advise the committee. Dr. Somerville also suggested that papers by large users of rubber would make valuable contributions to the conference.

The Crude Rubber Committee, through its new chairman, R. H. Gerke, reported that a final draft of the "Specifications for Testing the Variability of Normal and Concentrated Latex" had been approved for distribution for criticism and comment, and that final approval might be expected in 1938. In regard to the standard recipe developed by the Committee, work is in progress in the Far East to evaluate the Schopper and Scott testers. Work on other projects is progressing, such as testing cleanliness, preparing samples for plasticity tests, etc., but no satisfactory solutions have as yet been worked out.

A letter was read from C. C. Davis calling attention to the publication on August 25 of the A.C.S. Monograph No. 74, "Rubber Chemistry & Technology." He cited the names of many of the authors of various chapters as an indication of the high character of the type of material in the book, and suggested that members obtain copies for their laboratories and libraries. The appreciation of the Rubber Division for the work done by C. C. Davis and John T. Blake, editors of the book, and the authors of the various chapters, was given in an unanimous vote of thanks authorized to be sent to both editors and to each author by the Secretary.

Next Meeting in Detroit

A meeting of the new Executive Committee, following the close of the business session, resulted in a decision to hold the Spring Meeting of the Division in Detroit in late March or early April, rather than to hold it in conjunction with the other divisions of the A.C.S. which will convene in Dallas, Texas, the week of April 18.

New Officers
Rubber Division, A.C.S.
1937-38

Chairman: Dr. A. R. Kemp (Bell Telephone Labs.)
Vice-Chairman: George Hinshaw (Goodyear)
Sec.-Treas: C. W. Christensen (Monsanto)
Sergeant-at-Arms: L. V. Cooper (Firestone)
Executive Committee: H. L. Trumbull (Goodrich), W. A. Gibbons (U. S. Rubber), Lester Brock (C. P. Hall), F. H. Amon (Cabot), and Harold Gray (Goodrich).

GOODYEAR FOOTWEAR BUYS PHILLIPS-BAKER

Assets of the Phillips-Baker Rubber Company, manufacturers of rubber footwear, of Providence, Rhode Island, including real estate, machinery and equipment, patents, trade-marks and brand names, but not including finished and unfinished stock, company name or the company's list of customers, were purchased at public auction on August 20 by the Goodyear Footwear Corporation. Although the opening bid was for $100,000, the price paid by the Goodyear firm was reputed to be $225,000.

The Phillips-Baker Rubber Company was one of the pioneers of the rubber footwear business. The plant, which normally employed 1,000, was shut down in April of this year because of labor difficulties. Subsequently, the stockholders voted to liquidate the company, whereupon Samuel T. Freeman & Company, Boston, and the Henry T. Cooke Company, Providence, were instructed to sell the plant at public auction. Addison Freeman, of the Freeman concern, conducted the auction. The company's real estate was valued at $120,440 in 1936 for tax purposes and tangible personal property was assessed at $251,000. The real estate involved in the purchase comprises approximately 63,938 square feet of land. The plant consists of several one and two-story buildings.

The Goodyear Footwear Corporation, which was represented at the sale by James A. O'Hearn, a New York accountant, was incorporated in the State of Delaware on August 31, 1935. It maintains sales offices at Providence, R. I., Philadelphia, Penna., Chicago, Ill., and St. Louis, Mo., according to the Secretary of State at Dover, Delaware. Upon being queried as to the plans of the company with regard to the purchased assets of Phillips-Baker, William C. Waring, Jr., of the law firm of Edwards and Angell, Providence, R. I., representing the Goodyear Footwear Corporation, advised that "plans of the company are as yet incomplete."

It is believed, however, that the Goodyear concern, which has no connection with the Goodyear Tire and Rubber Company, will start manufacturing operations in the Phillips-Baker plant under its own name once all details are ironed out. It is also believed that Phillips-Baker will continue operations in the future, probably as a sales agency only.

Rumanian Tire Factory

A new tire factory is being erected in Rumania and will be operated by the firm of Banloc. According to report, American interests are participating in the construction and future operation of the factory. The government has granted several privileges to the new company, including an embargo on the importation of machinery for the manufacture of rubber products by other parties until November, 1938.

Coming Events

Sept. 24. Chicago Group, Rubber Division, A.C.S., Hotel Sherman, Chicago.

Sept. 29. Detroit Group, Rubber Division, A.C.S., University Club, Detroit.

Oct. 11-15. National Safety Council. (26th Safety Congress). Kansas City, Mo.

Oct. 18-20. National Association of Independent Tire Dealers, Hotel Stevens, Chicago, Ill.

Oct. 22-23. Ninth Annual Meeting of the Society of Rheology, Hotel Mayflower, Akron, Ohio.

Oct. 27-Nov. 3. National Automobile Show, Grand Central Palace, N.Y.C.

Dec. 5-11. Exposition of Chemical Industries, Grand Central Palace, New York City.

Apr. 18-21, 1938. Spring Meeting, American Chemical Society, Dallas Texas.

May, 1938. International Rubber Congress, London, England.

New Inland Factory

Construction will shortly be started in Clark Township, south of Cranford, New Jersey, of an eastern service plant for the Inland Manufacturing Division of the General Motors Corporation, according to Wallace Whittaker, general manager of Inland. The factory, sixth manufacturing unit of General Motors in New Jersey, will produce steering wheels, running boards, motor mountings and rubber and metal parts for automotive, refrigerator and radio uses, when completed. Inland recently increased its Dayton, Ohio, facilities.

Late News

By a vote of 8,464 to 3,193 (8 to 3), Goodyear workers on August 25 selected the United Rubber Workers of America as their sole collective bargaining agency. By a vote of 8,212 to 834 (10 to 1), Goodrich workers selected the same agency on August 27. The selection pertains only to collective agreements with the Akron factories of both companies.

Robert E. Casey, of Naugatuck Chemical, surprised his many friends in the industry with the announcement that he was married to Miss Florence Nestor of New York City on Saturday, September 4. Congratulations and best wishes, Bob.

L. C. Peterson, for the past two years superintendent of the Companhia Brasileira de Artefactos de Borrache, Rio de Janeiro, Brazil, and formerly with the India Tire and Rubber Company, is vacationing in this country. He was a visitor at the Rochester meeting of the Rubber Division, A.C.S., on September 8 and 9. Mr. Peterson expects to return to Brazil on October 9.

JULY CONSUMPTION SHARPLY UNDER JUNE

Consumption of crude rubber by manufacturers in the United States during the month of July is estimated to be 43,650 long tons, which compares with 51,798 long tons during June. July consumption shows a decrease of 15.7% under June and is 9.5% under July a year ago according to statistics released by the Rubber Manufacturers Association. Consumption for July, 1936, was 48,250 (revised) long tons.

Gross imports of crude rubber for July are estimated to be 39,108 long tons, a decrease of 20.1% under the June figure of 48,956 long tons but 9% over the 35,881 long tons imported in July, 1936.

Total domestic stocks of crude rubber on hand on July 31, are estimated at 164,445 long tons, which compares with June 30 stocks of 169,646 long tons and 235,850 (revised) long tons on hand July 31, 1936.

Crude rubber afloat to United States ports as of July 31 is estimated to be 75,779 long tons, which compares with 57,215 long tons afloat on June 30 and 60,343 long tons afloat on July 31 a year ago.

July reclaimed rubber consumption is estimated at 11,924 long tons; production at 17,885 long tons; and stocks on hand on July 31 at 16,646 long tons.

JUNE TIRE SHIPMENTS LARGER THAN IN MAY

Shipments of pneumatic casings during the month of June, estimated at 5,389,274 units, show an increase of less than 1% over May, but were 7.5% under shipments made in June, 1936, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for June is estimated at 5,339,238 units. This is a decrease of less than 1% under May and 4.9% below June, 1936.

Pneumatic casings in the hands of manufacturers on June 30, 1937, are estimated at 12,528,789 units, a decrease of less than 1% under the stocks on hand May 31, but 59.9% above stocks on hand June 30, 1936.

The actual figures are:

PNEUMATIC CASINGS

		Shipments	*Production*	*Inventory*
June,	1937	5,389,274	5,339,238	12,528,789
May,	1937	5,374,654	5,351,638	12,592,215
June,	1936	5,793,014	5,612,284	7,835,488
June,	1935	4,262,360	3,909,832	10,755,400

Plan Siam Rubber Factory

According to information from Bangkok, the Siamese government is contemplating the construction of a rubber factory. If plans go through, the factory will probably be located in the vicinity of Bangkok.

BOSTON RUBBER GROUP HOLDS FIRST OUTING

More than 120 members and guests attended the first annual outing of the Boston Group, Rubber Division, A.C.S., held at "Fieldston" in Marshfield, Massachusetts, on August 13. One of the highlights of the day, devoted to sports and entertainment, was a golf tournament between teams representing the Boston Rubber Group and the Rhode Island Rubber Club, won by the Boston team by 2 up. Individual prizes for the golf tournament were distributed as follows:

Low Gross: E. M. Rupert; *Second Low Gross:* J. M. Mason; *Third Low Gross:* Mr. Newall; *Low Net:* H. T. Mason; *Longest Drive:* A. L. Perry; *Kicker Handicap:* Tom Ashley (low), Ralph Huber (medium), A. W. Ross (high); *Highest score:* Don Wright; and *Second Highest Score:* Harry Atwater. Prizes were also given to the following for scoring the most 4s, 5s, etc., at the various holes: George Chane, E. L. Hanna, Frank Tobin, H. E. Ryerson, Fred Marriott, J. C. Walton, and C. F. Lawson. More than 75 members and guests participated in the tournament.

Toward the end of the sports activities, an exhibition of trick and fancy rifle and shotgun shooting was given by W. G. Hill of the Remington Arms Company. Following an excellent dinner, a film depicting modern methods of crime detection through photography was shown by Frank Sullivan, chief photographer of the Boston Police Department. A typical street band, transported from the streets of Boston by George Warren Smith, secretary-treasurer of the Group, roamed the grounds all day and furnished cheerful music.

Prizes distributed at the outing were made possible by the cooperation of the following firms: American Zinc Sales Co., B. C. Ames Co., Ansbacher-Siegle Corp., Barrett Co., Binney & Smith Co., Boston Woven Hose & Rubber Co., Godfrey L. Cabot, Inc., Cambridge Rubber Co., Colonial Beacon Oil Co., Davidson Rubber Co., E. I. duPont de Nemours & Co., Alfred Hale Rubber Co., Hallowax Corp., Hodgman Rubber Co., Hood Rubber Co., J. M. Huber, Inc. *India Rubber World*, D. H. Litter, Inc., Monsanto Chemical Co., N. J. Zinc Co., Pequanoc Rubber Co., Plymouth Rubber Co., Quabaug Rubber Co., Henry L. Scott Co., Titanium Pigment Corp., United Carbon Co., R. T. Vanderbilt Co., Vultex Chemical Co., C. K. Williams & Co., and Wishnick-Tumpeer, Inc.

General to Open Stores

The General Tire and Rubber Company, Akron, has organized the General Tire and Auto Supply Group Buying Association to open independently-owned and operated stores. These retail outlets, to be known as GTAS (General Tire Automobile Stores) will stock approximately 2,400 items, including General tires and nationally advertised merchandise. Gus J. Schaffner, Jr., has been placed in charge of the new department.

NEW RUBBER GROUP FORMED IN DETROIT

Approximately seventy-five men, representing rubber manufacturers and industrial users of rubber in and around the Detroit area, met recently at the University Club in Detroit to formulate plans for the organization of a rubber group similar in scope and operation to those maintained in Akron, Boston, Chicago, Los Angeles and New York. As a result of this preliminary meeting, the Detroit Group, Rubber Division, A.C.S., has been formed and will hold its first official meeting at the University Club on September 29.

Officers of the new group are: *Chairman*, W. J. McCortney, rubber laboratory, Chrysler Corporation; *Vice-chairman*, E. J. Kvet, technical superintendent, Baldwin Rubber Company; *Secretary-Treasurer*, J. Allen Bumpus, secretary and treasurer of Collord, Inc., 7049 Lyndon Avenue, Detroit, Michigan. H. C. Anderson has been appointed chairman of the Membership Committee, and J. H. Norton is chairman of the Entertainment Committee. The Executive Committee consists of the officers and Charles H. Lindsley, chief analytical chemist, Detroit plant of U. S. Rubber Products, Inc.

Features of the first official meeting of the Group will include a dinner and one or two talks. According to Mr. Bumpus, one of the talks will probably be a discussion of the testing of rubber, while the second is yet to be selected.

Photos by George Warren Smith

Scenes of the first annual outing of the Boston Rubber Group, held at "Fieldston", Marshfield, Mass., on August 13.

Financial News

GOODRICH NET SALES LARGEST IN HISTORY

Based on net sales for the first six months of the current year of $78,566,619, the largest for any first half-year in the company's 67-years of operation, the B. F. Goodrich Company, Akron, reported a net profit of $4,010,698, after provision for depreciation, interest and Federal income taxes but before provision for the surtax on undistributed profits, which compares with $2,727,606 for the first six months of the previous year. A contingency reserve of $500,000 has been set aside because of the fluctuating raw material prices, leaving a balance of $3,510,698 carried to the surplus account.

The net profit for the first half of the year was equal to $1.90 a share on the 1,303,255 shares of common stock outstanding. The board of directors declared a dividend of 50 cents a share on the common stock, payable on September 30 to stockholders of record as of September 18. The last previous payment was 50 cents on June 30. The directors also declared the regular quarterly dividend of $1.25 on the 412,031 shares of $5.00 preferred stock outstanding.

In setting a new first six months record, Goodrich increased its sales by $12,572,098 over the $65,994,521 reported for the January-June, 1936, period. The last previous high for the first period was in 1930 when sales totalled $78,007,291. Current assets of the company, according to the latest balance sheet, amount to $86,996,018, approximately four and one-half times the current liabilities of $19,017,004. Domestic bank loans on June 30 amounted to $1,600,000.

Brown Rubber Company

Twenty-one weeks ended May 29: Net profit amounted to $90,483. Net profit for the fifty-two weeks ended January 2, 1937, amounted to $141,091, after provision for the surtax on undistributed profits, which compares with net profit of $51,572 for the fifty-two weeks ended December 28, 1935.

United Carbon Company

Six months ended June 30: Net profit of $1,365,368, equal to $3.43 a share on 397,885 common shares, which compares with a net profit of $1,087,607, or $2.73 a share, reported in the first half of the previous year.

Raybestos-Manhattan, Inc.

Six months ended June 30: Net income amounted to $1,510,642, or $2.37 per share, after providing for all charges, expenses and taxes, and adding $150,000 to the reserve for contingencies, including the surtax on undistributed profits. This compares with net income of $989,122, or $1.55 per share, before provision for the surtax on undistributed profits, in the first six months of 1936. The company also declared a dividend of 50 cents per share, payable September 15, to stockholders on record as of August 31.

General Atlas Building Plant

A new carbon black plant is being constructed by the General Atlas Carbon Company, at Guymon, Oklahoma. The new plant will consist of four units with a combined capacity of 12,000,000 pounds of carbon pigment annually and is expected to be in operation by next Spring. The units at Guymon will include the latest mechanical developments in the production of black. Most of the equipment will be fabricated of special alloy metals whose resistance to corrosion will assure products of purity and uniformity. The plant will be located on the main line of the Rock Island Railroad which will permit easy handling of tank car shipments. The gas required for production will be purchased from the Cabot Carbon Company which has extensive holdings in the Guymon area. The choice of the new plant's location is in keeping with General Atlas's policy of not having all their manufacturing interests in one state. The company manufactures "Gastex" and "Pelletex" blacks.

Stress "Thiokol" Name

The word "Thiokol" is a registered trade-mark which applies to various synthetic rubber products manufactured and sold by the Thiokol Corporation, Yardville, N. J., and should not be used as a generic term. In stressing this point in a letter addressed to the trade recently, Thiokol stated that the trade-mark should always appear with an initial letter and be enclosed in quotation marks. When used with advertising matter it should be accompanied by the phrase, "Reg. U. S. Pat. Off.", according to the company.

Tire Workers' Earnings

Automobile tire workers receive the highest hourly rate of wages paid by 38 important industries, according to figures compiled by the Standard Statistics Company of New York. The average hourly wage earned by these workers amounts to 93.0 cents, as compared with 85.7 cents for automobile workers, 84.9 cents for printing and lithography employees, 88.3 cents for petroleum refining workers, and 81.4 cents for electricity and gas laborers. Wages of automobile tire workers have been increased by 60.8% since June, 1933, according to the statistical concern, exceeded only by a 71.8% increase received by cotton goods workers in the same period.

New England

Jenkins Bros., Bridgeport, Conn., reported that its net income after all charges for the first six months this year was $264,964 or $1.91 a share against $160,278 or $1.10 a share for the first half of last year.

Factory sales representatives of A. G. Spalding & Brothers, Chicopee, Mass., held an outing and clambake August 11 at Turner Park, East Longmeadow, Mass., with about 50 present, including men from the West Coast. William F. Reach was in charge of arrangements. During the week the representatives inspected the Chicopee plant and participated in sales discussions.

H. O. Canfield Company, plumbers' rubber goods, Bridgeport, Conn., has let contracts for a small addition to its Housatonic Avenue plant, 8 x 90 feet, to cost about $1,000.

The Raley Rubber Company, Riverton, Conn., will terminate operations in the near future. Mrs. Helen Raley, who has headed the business for a number of years, plans to fill current orders. The machinery will be sold and the building rented.

Administration of all plastic activities of General Electric Company has been consolidated at Pittsfield, Mass., and the company's construction materials sales division at Bridgeport, Conn., has been relieved of the responsibility of plastic sales, according to C. E. Wilson, G-E vice-president at Bridgeport. G. H. Shill has been appointed manager of the plastics department, which will have its headquarters on Plastics Avenue, Pittsfield. K. W. Nelson, formerly manager of G-E automotive product sales, has been named sales manager.

Raybestos-Manhattan, Inc., is building additions to its plant in Stratford, Conn., at a cost of $40,000. Extensive equipment is being installed to eliminate an alleged smoke and odor nuisance under agreement with the town government.

Thousands of employees of U. S. Rubber Products, Inc., in Naugatuck, Conn., have been enjoying outings during the Summer. The largest of the various affairs, held at Lake Quassapaug, Middlebury, on August 14, and sponsored by the Factory Council of the footwear division, drew about 5,000 persons. The Alembic Association of the Naugatuck Chemical division frolicked on August 21, and other departments of the Naugatuck plants have held outings at various points.

Thirty-six buses were used to transport 1,035 employees of the Seamless Rubber Company, New Haven, to the company's annual outing August 14 at Lake Compounce, Bristol.

Optimum Size gives **MICRONEX BEADS**

a distinct advantage in **FLOW** *handling*

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THE process by which Micronex Beads are made permits wide diversity in the size of finished pellets. It is possible to make them either smaller or larger than normal by changing the viscosity of the paste or by varying the speed or length of agitation.

A highly interesting division of the research in pellet black was that which covered size in relation to flow handling. Experiments covering every phase demonstrated that a bead approximately 0.025 inches in diameter was most suitable.

Such a bead exhibits mobility to a high degree and because of this property lends itself easily to mechanical handling since it is necessary only to provide suitably inclined conduits with proper means to arrest the supply when the desired quantity has been permitted to flow through the system.

Such a bead also possesses desirable structural characteristics—a smooth outer surface somewhat more dense than the average of the whole pellet, which serves to keep the bead intact until it has been ruptured by the shearing action of the rubber. The soft interior is then too closely in contact with the rubber mass to fly to any great degree.

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Service and Control Department

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MICRONEX MEANS MORE MILEAGE

Names in the News

C. F. GARASCHE has been elected president of the Titanium Pigment Corporation to succeed RALPH M. ROOSEVELT, recently resigned. IVAN D. HAGAR, general sales manager, has been elevated to a vice-presidency. Both men have served the company for many years.

JAMES S. PEDLER, aeronautic sales manager, B. F. Goodrich Company, Akron, was a member of the Contest Committee at the National Air Races held in Cleveland early this month.

RALPH HARRINGTON, a member of the advertising department of the General Tire and Rubber Company, Akron, since 1928, and previous to that engaged in sales promotion work, has been named advertising manager of the company. He announced that General's advertising appropriation for the current year is the largest yet made by the company.

NORMAN GRESHAM has been appointed manager of the specification department of the Ohio Rubber Company, Willoughby, Ohio, succeeding GEORGE STUMP who recently resigned to join the Wabash, Indiana, plant of General Tire.

HARRY P. SCHRANK, associated with the Seiberling Rubber Company, Akron, for the past eleven years, was recently named vice-president in charge of production for the company. Prior to his promotion he was factory manager.

FRANK E. TITUS, assistant sales manager, B. F. Goodrich Company, Akron, in charge of West Coast sales activities, completed thirty years of service with the company last month. He joined Goodrich in 1907 and has acted in various sales capacities.

WILLIAM REA, advertising agent, 1265 Broadway, New York City, who includes the Acticarbone Corporation among his clients, has been reappointed to the faculty of Pace Institute and will conduct courses in advertising. He is also associated with the advertising courses in Columbia University. MR. REA is a former member of the staffs of Batten, Barton, Durstine and Osborne, Inc., and Erwin, Wasey and Company two prominent advertising agencies.

ROY BILGER, formerly plant superintendent of the Coumbiana (Ohio) plant of the National Rubber Machinery Company, has been named plant manager, succeeding R. A. WATKINS. The new plant superintendent is RAY FISHER.

H. D. PENCE has accepted a position as chief chemist of the Kemitex Products Company, a subsidiary of the Seiberling Rubber Company, Akron. He formerly taught chemistry in Ohio high schools.

B. T. BUSH has resigned as manager of the Aromatics Department of the Naugatuck Chemical Division of U. S. Rubber Products, Inc., New York City. He had managed the department since its establishment. No announcement of a successor has yet been made.

C. E. JEREMIAS and E. A. SMITH have joined the Detroit office of the Mathews Conveyor Company, Ellwood City, Pennsylvania, as field engineers. The Detroit office is located at 2842 West Grand Boulevard.

PAUL DIETZ, B. F. Goodrich representative in war-torn Shanghai, despite cabled instructions from the company to leave the city, has decided to remain for the time being and has joined the "defense force", consisting of Americans, Britons, Frenchmen and other "foreigners."

W. A. PATTERSON, vice-president and sales manager, Pharis Tire and Rubber Company, Newark, Ohio, was named a member of the board of trustees of the Newark Community Chest last month.

HARRY P. COATS of the Firestone Steel Products Co., Akron, a Firestone Tire and Rubber subsidiary, was recently awarded a gold medal prize by the American Electroplaters Society for presenting the best paper on electrodeposition in 1936. The paper was "Brass Plating for Rubber Adhesion."

H. HOMER BASHORE has resigned as chief chemist of the Whitehead Bros. Rubber Company, Trenton, and has joined the Vulcanized Rubber Company, Morrisville, Pennsylvania, as assistant chemist to C. P. MORGAN.

J. F. DUNBAR, JR., well-known crude rubber expert, has joined Fred B. Peterson & Co., Inc., crude rubber brokers, in the capacity of assistant manager. The appointment was effective September 1.

E. T. RUFFNER, assistant superintendent of Goodyear Tire and Rubber Company's Java factory, was one of those slightly wounded when bombs dropped from a Chinese plane hit the *S.S. President Hoover* last month. He was en route to Akron.

JOHN M. TAYLOR has been appointed industrial engineer for the Vulcanized Rubber Company, Morrisville, Pennsylvania. He is an M.I.T. graduate and a native of New England.

CHARLES E. STOKES, JR., vice-president of the Home Rubber Company, Trenton, has been made a trustee of the Boys' Club of Trenton, Inc., an organization promoting welfare activities for the youth of the city.

ATKINSON DISCUSSES THE FUTURE OF AKRON

How closely the future of Akron as a prosperous industrial city is tied up with the rubber industry was the theme of a speech recently made by H. C. Atkinson, executive secretary of the Akron Chamber of Commerce before the Akron Optimist Club. He stressed the point that the many plants in Akron are, strictly speaking not tire factories, but a collection of factories manufacturing many rubber products, and that statistics show that tires will be a steadily decreasing factor within the rubber industry as a whole.

Mr. Atkinson stated that the rubber used in an automobile for cushioning, silencing, for rain-proofing and for wind-proofing far exceeds the quantity of rubber used in its tires. Rubber cushions are the basis of a great industry which Akron may or may not get in the future, he said, pointing out that these cushions are now being used in furniture, mattresses, train and theatre seats, etc. He also made reference to other recent rubber developments, such as the air spring suspension, Pliofilm, Koroseal and new types of rubber thread.

In concluding his talk, Mr. Atkinson said that Akron has had about all it wants of strife and bitterness, of attempts to stir class hatred and attempts to decrease the productivity of its factories, and that "a great awakening is overdue....no town in America has potentially a greater future if we will but open our eyes, get the vision, and work determinedly towards it."

General Asbestos Expansion

The General Asbestos and Rubber Division of Raybestos-Manhattan, Inc., North Charleston, South Carolina, has recently completed the installation of a new rubber hose manufacturing section and may shortly install a rubber-covered roll department, according to Ernest H. Jeffords, general manager. It is expected that a new building will be erected near the main office building to house the new department.

E. S. CROSBY has been named president of the Johns-Manville International Corporation, the export subsidiary of the parent concern. Three new vice-presidents were also recently named to the Johns-Manville Corporation, i.e., A. R. FISHER, formerly manager of the Manville (N. J.) plant; J. P. KOTTCAMP, manager of the mid-Western factory at Waukegan, Illinois; and ALEXANDER CROMWELL, manager of manufacturing operations on the Pacific Coast.

GEORGE W. STUMP, in charge of labor estimate and development work, Ohio Rubber Company, Willoughby, Ohio, has resigned from that post to join the Wabash, Indiana, plant of the General Tire and Rubber Company. He was with Ohio Rubber for 16 years.

TRENTON NEWS

The Mercer County Rubber Workers' Council, composed of eight union locals in the Trenton area, has been organized to adopt a platform of standard wages and better working conditions to be inserted in the new agreements with Trenton rubber manufacturers. The agreements now in effect with several manufacturers will shortly expire. The Council is said to represent approximately 4,000 workers from the plants of the Thermoid, Pocono, Puritan, Acme, Stokes, Vulcanized and Sloane-Blabon companies.

Goodyear Tire and Rubber Company, Akron, has leased 100,000 square feet of the factory operated by the J. L. Mott Company in Trenton. J. W. Bronaugh, manager of Goodyear distribution depots, negotiated the lease.

Ferodo & Asbestos, Inc., is erecting an additional factory building on its New Brunswick site. The new addition, to be 90 x 150 feet, will consist of a two-story office building and laboratory. Approximately 200 will be employed. The company makes brake lining, clutch facings and industrial frictional materials.

More than 300 attended the recent annual employees' picnic of the Thermoid Rubber Company, Trenton, held at Washington Crossing, N. J. Following sport and entertainment features, President Fred Schluter addressed the gathering and distributed service awards to various employees.

Forty-five locals of the United Rubber Workers of America recently held a conference in Trenton and prepared resolutions for presentation at the national convention. The locals represented rubber workers in several surrounding states.

Puritan Rubber Company, Trenton, is erecting a one-story factory addition. The company recently installed new equipment in its present quarters and made other improvements.

MILLER-TYDINGS ACT MAY STABILIZE TRADE

Further stabilization of the rubber industry, and particularly the retail tire price structure, is visualized by the passage of the Miller-Tydings Price Maintenance Act which was recently attached to a District of Columbia tax bill as a rider and which was signed by President Roosevelt under protest. This act effectuates state "fair trade" laws and permits manufacturers to contract for minimum resale price on advertised brands without danger of Federal prosecution under the anti-trust and monopoly laws. (See editorial on page 382).

In the past few weeks there have been recurring rumors of an impending price-cutting war among tire retailers. Tire manufacturers were quick to deny any such movement, claiming that a downward trend in replacement sales in the second quarter of the year resulted in some dealer price-cutting but that immediate "policing" of such dealers removed the threat of a price war.

In some quarters this trend was placed on the doorstep of the manufacturers themselves with the statement that inventories are larger than is justified by current market considerations but this is refuted by reference to past labor difficulties and the possibility of future labor troubles. In any case, applying the principles of the Miller-Tydings Act would avert any disastrous price slashing, according to business economists.

Deny Tire Price Cuts

Tire manufacturers in and around the Akron territory last month were unanimous in denying that any break in the tire price structure is imminent, despite rumors in brokerage circles that lower prices are partly responsible for the weakened condition of the rubber market. According to the manufacturers, sharp declines in dealer sales during the second quarter of the year led to some scattered price cutting which was quickly halted. The competitive situation in the retail tire market has been improved by the decision of Sears-Roebuck, Montgomery-Ward, and other mail order houses, to drop any reference to "road hazard guarantees" in their respective Fall catalogs. They are continuing to offer "satisfactory service", however.

Firestone Trailer Tires

Firestone Tire and Rubber Company, Akron, has placed on the market a new tire especially designed for use on commercial trailers and semi-trailers. The new tire is said to prevent side skid and to reduce operating costs by giving greater mileage. A deep-grooved, thick tread is contoured with a double radius, being practically flat in the center and flaring away on the outside ribs. The circumferential elements of the tread are buttressed in the grooves and on the shoulders to give stability. The fires are described as being "silent rolling" due to the circumferential lines of the tread.

CHICAGO GROUP PLANS FIRST FALL MEETING

The first Fall meeting of the 1937 season of the Chicago Group, Rubber Division, A.C.S., will be held on Friday, September 24th, at the Hotel Sherman in Chicago. The program, which will follow the usual dinner, is in charge of George Ellinwood of the Waukegan, Illinois, factory of the Johns-Manville Corporation.

Two speakers are scheduled, the first of which is Carl H. Zieme of the Republic Rubber Company, Youngstown, Ohio, who will present a paper entitled, "The Industrial Applications of Rubber in Industry." Mr. Zieme has been associated with Republic for twenty-six years, is a member of the American Society for Testing Materials, and is well qualified for his subject.

The second speaker will be J. C. Nichols, who will present motion pictures of Alaska in color. These pictures are now in the process of development and will be edited in time for the meeting. Mr. Nichols, a widely known adventurer and sportsman, has entertained the Chicago Rubber Group on previous occasions, and his talks and pictures have always been well received.

Incorporate Akron Metal Co.

The Akron Metal Stampings Company has been incorporated for $35,000 and is expected to start immediate production in the plant of the former Good Rubber Company at 2705 Wingate Avenue in Akron. The principal function of the new concern will be to furnish metal brackets to rubber factories where they will be rubber-plated and sold as automobile parts. C. F. Minnear is general manager of the new company; O. G. Camp is president; and William S. Campbell and F. F. Dugan are members of the board of directors.

OBITUARIES

Thomas F. Walsh

Thomas Francis Walsh, one of the founders and subsequently president of the Swinehart Tire and Rubber Company, died on August 10 following a fall from a second story window at his estate in Akron. He was 78 years old. Mr. Walsh entered the business world in Cuyahoga Falls where he worked for his father as a boy in the paper manufacturing business. He later studied law and was admitted to the bar in 1883. In 1910 he became interested in the Swinehart Tire and Rubber Company and in 1912 was elected president. He leaves a widow, daughter and three sons. Funeral services were held on August 11 at St. Martha's Church in Akron.

LOS ANGELES NEWS

Thirty-nine members and guests of the Los Angeles Group, Rubber Division, A.C.S., joined the annual deep sea fishing excursion out of San Diego Harbor on Sunday, August 8. Ed Royal (H. M. Royal Co.) was in charge of the excursion held on the *Star Angler* which headed for the Coronado Islands off the Mexican coast.

While the fishermen were primarily seeking tuna and yellowtail, the chief catches were calico bass and barracuda. For his pessimism in declaring that only three sport fish would be caught (two more than were caught), J. B. Cannon (U. S. Rubber) was awarded a special prize as the individual guessing closest to the actual catch. W. G. Tapping (Cutler-Hammer) won the grand prize of the day for landing a 14-pound yellowtail. A cash prize was also won by R. E. Hutchinson (Firestone).

The prizes were made available by the cooperation of the following companies: American Cyanamid & Chemical Corp., Binney & Smith Co., Blue Star Mines, Farrel-Birmingham Co., J. M. Huber, Inc., Pacific Coast Talc Co., Paterson Parchment Co., H. M. Royal, Inc., San Francisco Sulphur Co., Western Shade Cloth Co., and others. The Los Angeles Group also contributed a few prizes.

Prior to the excursion, the entire group met at the Hotel San Diego for an elk steak dinner, the steaks being donated by the Darnell Corporation of Long Beach, California. Excellent weather was enjoyed during the fishing trip, during which Ed Royal and Garvin Drew took colored motion pictures which will be shown to the members at the first meeting of the Group to be held.

The September issue of *Southern California Business*, the monthly publication of the Los Angeles Chamber of Commerce, was dedicated to the rubber industry. The activities of "the big four" in Los Angeles were well covered and it was pointed out that the number of people employed by these companies was equivalent to the population of Santa Barbara. T. Kirk Hill, chairman of the Los Angeles Rubber Group, cooperated closely with the Chamber of Commerce in compiling the necessary data. Copies of the special issue may be secured by addressing the Chamber of Commerce.

Regular monthly meetings of the Los Angeles Rubber Group will be resumed in October, according to Group officers. The monthly meeting plan, adopted three years ago, has proved popular. The Group, which now has a membership of approximately 170, generally meets on the first Tuesday of each month. Generally, one educational and one entertainment feature are presented. As far as is now known, meetings will continue to be held in the Rainbow Room of the Hotel Mayfair in Los Angeles.

The Kirkhill Rubber Company, Hoover and Slauson Avenues, Los Angeles, whose factory and office buildings were severely damaged by fire in July, is rushing repairs. In the future, the offices will be over the warehouse on the opposite side of the street from the factory and the space formerly used for the offices in the damaged building will be used for production purposes. The additional factory space has long been needed, according to T. Kirk Hill, president of the company.

Roxalin Using Display Trailer

The Roxalin Flexible Lacquer Company, Elizabeth, New Jersey, is using a display trailer to promote the sale of its goods. The trailer, which contains an ordered array of more than 200 parts and assembled products which are actually in commercial production and which have been finished with Roxalin flexible lacquer and synthetic coatings, has been christened the Roxalin Trail Blazer. It is being used on selected calls in the New York and New England territories.

International Latex Moves

The International Latex Corporation, manufacturers of rubber pants and other infant specialties, has moved its headquarters from Rochester, N. Y., to Platex Park, Dover, Delaware. The company maintains sales offices in New York City.

PROGRAM ARRANGED BY RUBBER SAFETY GROUP

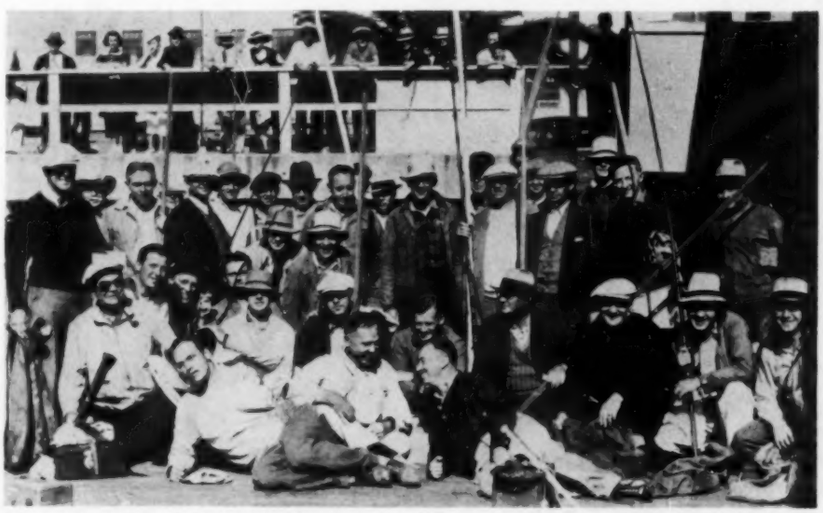
The Rubber Section of the National Safety Council has arranged its program for the meeting it will hold in Kansas City, Missouri, in conjunction with the 26th National Safety Congress and Exposition, to be held the week of October 11 to 15. The Rubber Section will meet in Room 205 of the Municipal Auditorium on Thursday afternoon, October 14. The program will start at 2:00 P. M. with opening remarks by J. M. Kerrigan, general chairman of the Section.

After his opening remarks, Mr. Kerrigan will outline the outstanding facts concerning the safety contest for this year sponsored by the Rubber Section, following which the various awards will be presented by an officer of the National Safety Council. Election of officers for the 1937-38 season will then take place.

The feature of the meeting will be a round table discussion on several problems pertinent to the rubber industry. These problems include: (a) What is a workable plan for good housekeeping? (b) What are the outstanding fire hazards and how can they be minimized? (c) How can hand tool injuries be prevented? (d) What types of mill and calender safeties are most satisfactory, and why? (e) What protective apparel is necessary for the workers? (f) What hazards are involved in molding small rubber parts and how can they be overcome? Additional problems will be added as desired by delegates to the meeting.

Preparing Auto Show

Preparations are under way for the opening of the National Automobile Show which will be held in Grand Central Palace, New York City, from October 27 to November 3. Four floors will again be used to house all of the exhibits, including automobile models, parts and accessories and trailers.



Members and guests of the Los Angeles Rubber Group who joined the annual deep sea fishing cruise, held this year on August 8, to the Coronado Islands off the Mexican coast.

BENEFITS SECURED FROM TRADE PACTS

Considerable benefits have been accorded American rubber export products from the many reciprocal trade agreements signed between the United States and various countries, 16 in all to date. These benefits apply to practically all rubber products, especially tires, tubes, footwear, belting and hose, and heels and soles.

Reductions in duty on rubber tires, indicated in parenthesis, have been made by the following countries: Cuba (25%), Haiti (40%), Sweden (17%), Brazil (25%), Canada (14%), Guatemala (33%), France (33%), Finland (10%), and El Salvador (65%). Similar reductions have been made on tubes in almost all cases. Duty on rubber boots and shoes and on canvas rubber-soled shoes have been reduced 26% to 37% by Cuba, 10% to 12% by Canada, 37% to 50% by Colombia, and by one or two other countries.

Reductions ranging from 14% to 65% have been effected in rubber hose and tubing, while duties have been reduced from 14% to 22% on other rubber manufactures. An 18% reduction in the duty on rubber heels and soles has been put into effect by Canada.

To Develop Philippines

The Goodyear Tire and Rubber Company, Akron, has offered its cooperation to President Quezon of the Philippine Republic toward the development of rubber plantations in the Islands. The announcement was made shortly after a meeting between President Quezon and P. W. Litchfield, president of Goodyear, in New York City. Goodyear now operates a 2500-acre plantation in the Philippines, the largest the country allows, one-half of which is already in bearing. According to Goodyear experts, the average yield per tree on its Philippine plantation is almost four times as much as that from ordinary seedling rubber trees which now supply almost all of the world's supply. One important feature in the Goodyear announcement is seen in the fact that development of new rubber areas in the Far East is practically forbidden under the terms of the International Rubber Regulation Agreement whereas the Philippines have considerable area available for development into rubber plantations.

$960,000 in Tire Taxes

The thirty-odd tire manufacturers in the United States paid the government a total of $960,000 in income taxes for 1934 on an aggregate gross income of $223,508,000, according to a report of the United States Treasury Department. After deducting operating costs and other exemptions the taxable gross income amounted to $6,734,000. More than two-thirds of the tire manufacturers showed deficits for the year and thus paid no taxes.

New Rubber Goods

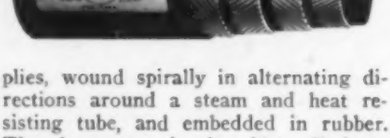
Bates Frez-It Pak

A new style of ice bag, called the Bates Frez-It Pak, has been developed by the Merchants and Manufacturers Company, Springfield, Massachusetts.

Said to be suitable for relieving headaches and for general sick-room use, the pack consists of a double row of hermetically sealed rubber sections which are filled with a liquid that freezes in forty-five minutes and remains cold for fully an hour. One side of the pack, that placed on the head or body, has a smooth surface. The liquid sealed in the rubber sections is said to prevent the rubber from drying out or cracking and to keep the individual rubber sections from sticking together. Although the construction of the new style ice bag permits instant use once the liquid is frozen (in the refrigerator on the same principle as ice cubes in the tray), tie-holds are provided at each corner to permit the joining of one or more paks if desired or to hold a single pak tightly in position. The pak may also be used as a hot water bag by simply immersing it in hot water.

Great Seal Asbestos Cord

Under the trade name of Great Seal Asbestos Cord, the New York Belting and Packing Company has added a new type to its line of steam hose, especially intended for superheated steam service. It is made with four asbestos cord



plies, wound spirally in alternating directions around a steam and heat resisting tube, and embedded in rubber. The ply construction is said to eliminate all possibility of shearing action when the hose expands or is flexed in service. It is comparatively light in weight, flexible and easy to handle, according to the manufacturer. It is available in five sizes, accommodating pressures ranging from 175 to 200 pounds, depending on the size. Maximum lengths are 50 feet.

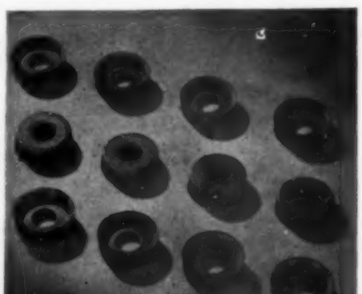
Kiko the Kangaroo

A new cartoon character — Kiko the Kangaroo — has been added to the line of inflatable toys featured by the Miller Rubber-Toy Division, B. F. Goodrich Company, Akron, Ohio. The inflatable novelty follows the Terry Toon creation as to color, shape and

style, even to the long, curling tail and the boxing gloves made popular in motion pictures. Other Miller inflatable toys include Popeye the Sailor, Eugene the Jeep, Felix the Cat, Orphan Annie and Moon Mullins.

Garlock Molded Cup Washers

Garlock Packing Company, Palmyra, New York, is manufacturing a line of cup washers molded from a Thiokol compound. Termed "Style 7707", these



cup washers are being used successfully in hydraulic cylinders on dental chairs. According to Garlock, a very expensive cup of foreign manufacture had been used in this connection with indifferent success prior to the development of the Thiokol type. Thiokol compositions are resistant to oil, gasoline and other solvents.

Gates Flex-Flo Tube

Designed for silent, scratchless filling operation and elimination of gasoline drip, the Flex-Flo pump hose nozzle tube is being featured by the Gates

Rubber Company, Denver, Colorado. Molded from Thiokol, the tube may be turned in any direction with ease, enables the operator to quickly insert it into the curved-elbow gasoline tanks used as standard equipment on most of the new cars, and eliminates the dripping which is said to be inevitable with the flexible metal type of nozzle tube.

Master-Rayon Tire

Featuring a tread surface comprising a plurality of ribs, arranged in such manner that there are certain characteristics common to all while some ribs have individual features, the Master-Rayon Safety Grip Tire has been developed by the Master Tire and Rubber Corporation, Akron,

Ohio. The shoulder lugs are staggered on the opposite side of the tire while the changes in rib direction are also staggered or alternated. Because of this construction, the new tire presents no closed areas anywhere on its surface, thus avoiding any trapping of air during use.

Rubber Bicycle Suspension

A new type of rubber suspension for bicycles has been developed by the Poynton Frame Manufacturing Company, Ltd., Wharton Street, Nechells, Birmingham, England. The suspension consists of a pair of steel stamping fork ends which are brazed into straight fork sides, and a pair of slotted links or shackles into which specially molded "H" section rubber blocks are fitted. The links are pivoted at the rear end on specially made pins passing through the fork-end stampings, and at the other end special sleeve nuts hold the wheel rigidly between the two links. Being pivoted at the rear end and controlled between the rubber cushion blocks, the wheel moves up and down sufficiently to absorb all road vibration. Use of this suspension system relieves the strain on the bottom tubes of the frame and on the steering stem, thus enabling lighter tubing to be used. Bicycles fitted with this suspension are said to have stood up well under severe road tests.

Burgess Safety-Lite

A new line of insulated flashlights under the brand name of the Burgess Safety-Light has been introduced by the

Burgess Battery Company, Freeport, Illinois. Pliable rubber fittings on the head and end cap of these flashlights give water-tight assembly, while rubber cushioning guards against breakage. Streamlined in appearance this new flashlight has a special fibre barrel which sheds water and which is said to safely resist 22,000 volts. The case is free of any exposed metallic surface. The rubber head is octagonal in shape which prevents the light from rolling when it is placed on flat surfaces.

McDonald Safety Hat

A new safety hat is being distributed by the Davis Emergency Equipment Company, New York City, which features a molded rubber brim left sufficiently flexible so as to reduce the possibility of the hat being knocked off while working in close quarters. Known as the McDonald Safety Hat, it is molded of duraluminum, combining light weight and comfort with safety. It features adequate ventilation for underground work, a floating interchangeable head band and molded suspension lugs which make the changing of headbands a simple operation.

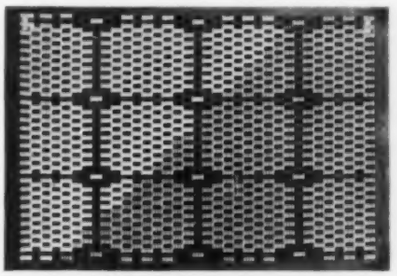
Fisk Safti-Flight Tire

The Fisk Tire Company, Inc., Chicopee Falls, Mass., has introduced the Safti-Flight tire which features a seven-

rib, high profile construction. Although the tread looks like a continuous rib with white cross-markings it is actually divided into several hundred independently acting deep rubber cleats, each one insulated from its neighbors by a ribbon of soft white rubber. The new tire, made with both white and black side-walls, is said to be extremely flexible, with rolling resistance reduced because of the continuous rib effect.

Goodrich Link Mats

Incorporating many new features, a line of link mats has been introduced by the B. F. Goodrich Company, Akron, Ohio. The links, which are of increased size both as to length and thickness, are made of rubber, each link being supplied with four sharp corrugations or ridges on either side to give it maximum scraping action. The ends of the links carrying the wire are designed so that at no time are they subjected to foot pressure which might cause wires to cut through the rubber.



The end nosing on all four sides of the mat contains a reinforcing bar of tempered steel. All of the mats in the new line are reversible. There are eleven colors available.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, SEPTEMBER 9, 1937

Crude Rubber

CRUDE rubber prices moved in a narrow range throughout the month of August in the absence of any particular feature and because of the watchful-waiting attitude of both trade and speculative interests. Factory buying was held at a minimum by four successive weekly increases recorded in British stocks, by increased offerings of crude rubber from the Far East, and by reported increases in stocks afloat. Return of factory buying in substantial quantities brought the price of crude up on the Commodity Exchange during the last few days of August, reaching 18.41 on August 31. Low for August was an 18.13 quotation on August 16. In keeping with other commodities, the price of crude rubber has been advancing in the past few days due to renewed war scares in Europe. The possibility that rubber shipments from the Far East may also be curtailed due to lack of available shipping space on Japanese vessels, has also served to bolster up the crude rubber price which reached 19.20 yesterday (September 8). Quotations in the outside market, Exchange, London and Singapore, follow:

As of September 9

Plantations—

Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.19⅜
October-December	—	@	.19⅜
January-March	—	@	.19⅜
No. 2	—	@	.19
No. 3	—	@	.18¾
No. 4	—	@	.18½
Thin Latex Crepe	—	@	.20⅜
Thick Latex Crepe	—	@	.20⅛
Brown Crepe, No. 1	—	@	.18⅛
Brown Crepe, No. 2	—	@	.17½
Amber Crepe, No. 2	—	@	.18⅛
Amber Crepe, No. 3	—	@	.17⅝
Amber Crepe, No. 4	—	@	.17¼
Brown Crepe, Rolled	—	@	.15⅞

Latex—

Liquid Latex, per gal.	.70	@	.71

Paras—

Up-River, fine	—	@	.19¾
Acre Bolivian, fine	—	@	.20

Balata—

Block, Ciudad	—	@	.30

LONDON MARKET

Standard Smoked Sheets—Buyers—September 9			
October-December	—	@	9 1/16d
January-March	—	@	9 1/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—September 9			
October-December	—	@	8 7/8d
January-March	—	@	9d

Reclaimed Rubber

Reclaimers report fair activity in the trade although the decline in tire production has affected the demand from that channel somewhat. Some reclaimers are proceeding cautiously although they expect business to hold up for the next few months. July consumption of reclaim declined sharply along with crude rubber consumption, the proportion of reclaim to crude also dropping. There has been no change in prices since our last report. Current quotations follow:

Shoe

Unwashed	lb.	.07	@	.07¼
Washed	lb.	.10	@	.10½

Tube

No. 1 (Floating)	lb.	.19	@	.19¼
No. 2 (Compounded)	lb.	.10½	@	.11
Red tube	lb.	.10½	@	.11

Tires

Black (acid process)	lb.	.07¼	@	.07½
Black, selected tires	lb.	.06¼	@	.06½
Dark Gray	lb.	.10	@	.10½
White	lb.	.15	@	.15½
Truck, Heavy Gravity	lb.	.06½	@	.07
Truck, Light Gravity	lb.	.08	@	.08½

Miscellaneous

Mechanical blends	lb.	.04½	@	.05

Scrap Rubber

(Delivered Akron Mills)

Scrap rubber dealers report continued demand from reclaimers with moderate supplies on hand. Increased demand is anticipated for the Fall. Since our last report, prices have dropped slightly on several brands, including clean solid truck tires and boots and shoes. Floating tube stock is reported limited. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	23.50	@	25.00
Mixed auto	ton	14.00	@	14.50
Beadless tires	ton	19.00	@	20.00
Clean solid truck tires	ton	28.00	@	30.00
Boots and shoes	ton	21.00	@	23.00
Arctics, untrimmed	ton	17.00	@	19.00
Inner tubes, No. 1	lb.	.11¾	@	.12¾
Inner tubes, No. 2	lb.	.06⅛	@	.06¾
Inner tubes, Red	lb.	.06⅛	@	.06¾

Cotton

Uncertainty regarding the promised loan from the Government which was anticipated as being below the market price, the breaking of the drought in the western belt leading to a freer movement of crops, and the unfavorable developments in the Far East which led to consideration of the possibility that takings of American cotton by Japan might be curtailed, all combined to break cotton prices to new lows since our last report. Starting from a 10.75 quotation on August 11, the price for middling uplands declined steadily until it touched 9.29 on September 1. Renewed buying activity brought the price back to slightly higher channels in the first few days of this month, but the Government Crop Reporting Board's estimate of 16,098,000 bales from this season's crop, made on September 8, brought the price down again to 9.33. In many quarters continued decline is visualized until the price settles around a 9-cent figure. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	Aug. 10	September 9		
	Close	High	Low	Close
September	10.34	9.12	9.12	9.12
December	10.32	9.21	9.08	9.13
March	10.44	9.35	9.22	9.27

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.30	@	.30¼
Peeler, carded, 23/4/3	lb.	.31	@	.31¼
Peeler, carded, 15/3/3	lb.	.28	@	.28¾
Peeler, carded, 13/3/3	lb.	.27	@	.27¼
Egyptian, carded, 23/5/3	lb.	.44	@	.44¼
Egyptian, combed, 23/5/3	lb.	.49	@	.49¼
CHAFERS				
Carded, American, 1 1/16"	lb.	.30	@	.30½
Carded, American, 1"	lb.	.26	@	.28½

Sheetings

48x40	36 in.	5.50	lb.	— @	.04⅜
40x40	36 in.	6.15	lb.	— @	.03⅞
40x36	36 in.	6.50	lb.	— @	.03⅜
48x48	40 in.	2.50	lb.	— @	.09¼
48x48	40 in.	2.85	lb.	— @	.08
56x60	40 in.	3.60	lb.	— @	.08
48x44	40 in.	3.75	lb.	— @	.06¾
44x40	40 in.	4.25	lb.	— @	.05⅞

Ducks

Enameling (single filling)	lb.	.27½	@	.29½
Belting and Hose	lb.	.28	@	.28½
Single filling, A grade	lb.	.12¾	@	.14
Double filling	lb.	.13¼	@	—

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM AUGUST 11 TO SEPTEMBER 9

Date		Spot	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sales
Aug.	11	18.44	18.45	18.47	18.52	18.57	18.62	18.66	18.70	18.75	18.80	18.84	18.88	18.93	——	139
	12	18.38	18.35	18.37	18.43	18.50	18.57	18.61	18.65	18.68	18.73	18.77	18.82	18.87	——	173
	13	18.31	18.26	18.28	18.34	18.40	18.45	18.50	18.55	18.59	18.64	18.69	18.73	18.77	——	168
	14	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	15	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	16	18.13	18.08	18.11	18.24	18.27	18.31	18.36	18.42	18.48	18.51	18.55	18.59	18.63	——	291
	17	18.25	18.26	18.27	18.34	18.40	18.46	18.53	18.59	18.65	18.68	18.72	18.75	18.79	——	179
	18	18.25	18.22	18.23	18.34	18.38	18.39	18.48	18.54	18.61	18.64	18.68	18.72	18.76	——	101
	19	18.18	18.16	18.18	18.27	18.33	18.39	18.45	18.51	18.57	18.61	18.65	18.69	18.73	——	159
	20	18.25	18.18	18.20	18.28	18.34	18.40	18.48	18.54	18.60	18.64	18.68	18.72	18.76	——	413
	21	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	22	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	23	18.28	18.27	18.28	18.37	18.43	18.47	18.53	18.59	18.66	18.70	18.74	18.78	18.82	——	295
	24	18.35	18.35	18.36	18.45	18.51	18.56	18.61	18.68	18.76	18.80	18.84	18.88	18.92	——	204
	25	18.28	18.27	18.29	18.37	18.43	18.49	18.55	18.61	18.68	18.72	18.76	18.80	18.84	——	252
	26	18.31	18.29	18.31	18.40	18.45	18.50	18.56	18.63	18.70	18.75	18.80	18.85	18.90	——	227
	27	18.31	——	18.30	18.37	18.43	18.49	18.55	18.61	18.68	18.72	18.77	18.81	18.85	——	374
	28	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	29	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	30	18.31	——	18.31	18.38	18.45	18.51	18.59	18.66	18.74	18.78	18.82	18.86	18.90	——	338
	31	18.41	——	18.40	18.47	18.54	18.62	18.68	18.74	18.80	18.84	18.89	18.93	18.97	——	74
Sept.	1	18.38	——	18.35	18.42	18.48	18.55	18.60	18.65	18.70	18.74	18.78	18.82	18.86	18.90	43
	2	18.78	——	18.82	18.85	18.87	18.90	18.93	18.96	19.00	19.05	19.10	19.14	19.18	19.22	186
	3	18.68	——	18.69	18.73	18.77	18.82	18.86	18.92	18.96	19.03	19.07	19.11	19.15	19.19	312
	4	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	5	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	6	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	7	18.93	——	18.94	18.99	19.02	19.06	19.11	19.16	19.21	19.26	19.31	19.36	19.41	19.46	171
	8	19.20	——	19.25	19.28	19.31	19.35	19.40	19.45	19.50	19.53	19.56	19.59	19.62	19.69	330
	9	19.18	——	19.14	19.20	19.25	19.28	19.37	19.40	19.44	19.47	19.50	19.52	19.55	19.58	194

Rubber CHEMICAL Markets

NEW YORK, SEPTEMBER 13, 1937 [All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.26 @	—
A-5-10	lb.	.34 @	—
A-11	lb.	.57 @	—
A-19	lb.	.57 @	—
A-32	lb.	.72 @	—
A-77	lb.	.47 @	—
A-100	lb.	.47 @	—
A-433	lb.	.50 @	—
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.47
Diphenylguanidine	lb.	.37 @	—
El-Sixty	lb.	.57 @	—
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½ @	.42
Guantal	lb.	.45 @	—
Heptene	lb.	.40 @	—
Hexamethylenetetramine	lb.	.36 @	—
Lead Oleate, No. 999	lb.	.12 @	—
Witco	lb.	.12 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	—
Phenex	lb.	— @	.55
Pip-Pip	lb.	2.50 @	—
Pipsolene	lb.	1.75 @	—
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.65 @	—
R-23	lb.	.57 @	—
Satex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.26 @	—
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.65 @	—
Ureka Blend B	lb.	.65 @	—
Ureka C	lb.	.60 @	—
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.51 @	—
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.07½ @	.08½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.37
Ultramarine	lb.	.15 @	—
Browns			
Mapico	lb.	.13 @	—
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome	lb.	.21 @	—
Chromium Oxide, bbl.	lb.	.21 @	—
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimson, 15/17	lb.	.48 @	—
sulfur, tree	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone, No. 19	lb.	.05⅞ @	.06⅛
Cryptone CB, No. 21	lb.	.05⅞ @	.06⅛
Cryptone, ZS-20	lb.	.09 @	.09¼
Cryptone, ZS-86	lb.	.09 @	.09½
Lithopone			
Albalith, black label—11	lb.	.04⅜ @	.04⅝
Azolith	lb.	.04⅜ @	.04⅝
Rayox	lb.		
Titanox A	lb.	.16 @	.16¾
Titanox B	lb.	.05⅞ @	.06⅛
Titanox C	lb.	.05⅞ @	.06⅛
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06¼ @	.06½
Anaconda, lead free	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06¼ @	.06½
XX Red—4	lb.	.06¼ @	.06½
XX Red—72	lb.	.06¼ @	.06½
XX Red—78	lb.	.06¼ @	.06½
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Blue label—16	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06¼ @	.06½
green label	lb.	.06¼ @	.06½
red label	lb.	.06¼ @	.06½
U. S. P.—7, bbls.	lb.	.09 @	.09¼
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Chrome	lb.	.14½ @	.15½
Mapico	lb.	.09½ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	13.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	62.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	23.65 @	31.15
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	60.00 @	65.00
Calcene	ton	37.50 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	9.00 @	21.00
Congaree	ton	9.00 @	—
Crown (f.o.b. plant)	ton	9.00 @	—
Dixie	ton		
Dixie, Jr.	ton		
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.11 @	.15
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
"Lime Crest" Industrial Filler No. 100	lb.	— @	—
Magnesium carbonate	lb.	.07 @	.09
Mica	ton	35.00 @	44.00
Pyrax A	ton	— @	—
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00 @	20.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Witco	ton	7.00 @	—
Wood Flour	ton	20.00 @	25.00
Zinc Carbonate	lb.	— @	.11½
Zinc Stearate	lb.	.20 @	.23

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	25.00 @	—
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

MISCELLANEOUS

Aromatics—Rodo	lb.		
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors No. 5145	lb.	.00 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.40 @	—
Santomerse (dispensing, wetting, penetrating and stabilizing agent)	lb.	.13 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tackol (tackifier)	lb.	.115 @	—
Tonox	lb.	.50 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls. 100 lb.		2.53 @	2.78
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.15 @	16
Stearex Beads	lb.	.10¾ @	.11¾
Stearic, doub. pressed	lb.	.12½ @	.13½
Stearite	lb.	.10½ @	.11¾
Alkalies			
Caustic Soda 76%	cwt.	3.05 @	4.25
Soda Ash, 58% C.L.	cwt.	1.25 @	3.05
Oils			
Cycline Oil	gal.	.20 @	—
Degras, bbls.	lb.	.07¾ @	.08
Fluxrite	lb.	.05½ @	.06½
Palm Niger	lb.	.05½ @	.06½
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.03⅜ @	.03¾
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.64 @	.69
dest. dist., drums	gal.	.49 @	.50
Rosin Oil, cmpd	gal.	.40 @	—
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rubtack	lb.	.08 @	.10
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07 @	—
Witco Softener	gal.	.18 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	
Resins and Pitches			
Pitch, Burgundy	lb.	.05½ @	.06½
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	ton	20.00 @	26.00
Solvents			
Acetone, pure	lb.	.06 @	.06½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33 @	.39
Benzene, 90%	gal.	.18 @	.23
Beta-Trichlorethane	gal.	— @	—
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05¼ @	.08
Carbon, tetrachloride	lb.	.05¾ @	.08
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.41 @	.50
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.43 @	.47
dest. dist., drums	gal.	.33 @	.41
Waxes			
Beeswax, white	lb.	.39 @	.45
Carnauba, yellow	lb.	.46 @	.47½
Ceresin, white dom.	lb.	.08 @	.11
Montan, crude	lb.	.10¾ @	.11¾
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02¾ @	—
White crude scale 124/126	lb.	.02¾ @	.03
Refined, 122/127	lb.	.04½ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol H	lb.	.54 @	—
Flectol White	lb.	1.00 @	—
Flectol B	lb.	.54 @	—
Neozone	lb.		
Oxynone	lb.	.68 @	—
Perflectol	lb.	.67 @	.75
Retardex	lb.	.35 @	.40
Santoflex A	lb.	— @	—
Santoflex B	lb.	.54 @	—
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Mold Paste	lb.	.18 @	—
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rusco, f.o.b. Nitro	lb.	.25 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.23 @	—
Black	lb.	.08½ @	—
White	lb.	.095 @	.15
Brown	lb.	.095 @	.14
Neophax	lb.	.13 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.02½ @	.04
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	2.55 @	3.65
Commercial (bags)	cwt.	1.60 @	2.35
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,362	185,060,304	26.71	8,772	5,672,319	28.87	300,590
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1935:							
Dec.	38,417	9,930,710	11.54	1,821	523,997	12.85	36,596
1936:							
Jan.*	32,310	8,037,997	11.94	733	229,129	13.98	31,577
Feb.	32,879	9,293,711	12.62	625	199,956	14.27	32,254
Mar.*	33,447	9,845,776	13.14	1,172	390,551	14.88	32,275
Apr.*	44,218	13,967,712	14.10	984	343,785	15.59	43,234
May*	35,578	11,460,157	14.38	1,589	580,021	16.30	33,989
June	36,376	12,073,632	14.82	2,469	904,669	16.35	33,907
July	38,178	12,763,200	14.92	1,383	510,075	16.47	36,795
Aug.	40,027	13,364,916	14.91	840	307,114	16.32	39,187
Sept.*	48,368	16,691,919	15.41	656	244,554	16.64	47,712
Oct.	39,573	13,627,465	15.37	778	268,645	15.42	38,795
Nov.*	36,798	12,790,306	15.52	675	241,982	15.99	36,123
Dec.	49,312	17,555,705	15.89	677	267,745	17.65	48,635
1937:							
Jan.	42,002	15,408,242	16.38	844	372,053	19.69	41,158
Feb.	42,743	16,470,867	17.20	523	236,853	20.21	42,220
Mar.	38,682	16,030,267	18.50	1,146	522,931	20.37	37,536
Apr.	41,275	17,859,223	19.31	1,050	415,484	17.66	40,225
May	46,902	22,163,440	21.10	528	270,499	21.08	46,374
June	47,073	22,559,545	21.39	807	390,542	21.60	46,266

* Revised.

Note: Annual figures for 1922-1936 revised on basis of information received on February 8, 1937. Figures for 1922 and 1923 include latex; guayule is included only in 1922.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1936:								
Aug.	146	37,147	72	23,715	321	64,769	1,761	602,992
Sept.	106	29,335	21	9,846	418	85,624	1,800	692,810
Oct.	114	31,489	11	4,815	452	102,485	1,392	500,817
Nov.	159	43,980	43	19,408	405	91,538	1,631	578,729
Dec.	134	36,972	14	7,247	538	109,208	2,070	735,156
1937:								
Jan.	160	44,166	10	4,348	247	56,056	1,337	535,546
Feb.	206	56,807	14	5,838	242	61,741	1,973	775,202
Mar.	136	37,453	29	13,949	898	187,413	2,216	968,053
Apr.	190	52,361	3	1,457	617	135,412	1,633	724,757
May	182	50,093	75	33,881	642	145,618	1,995	941,235
June	147	39,941	91	41,481	488	135,468	2,561	1,253,370

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)
(All Quantities in Long Tons)

	Figures on Monthly Basis: 1930	1931	1932	1933	1934	1935	1936*	1937
Jan.	36,194	28,557	29,648	22,645*	39,190*	46,636*	48,631	50,818*
Feb.	33,302	28,797	31,821	21,392*	40,515*	42,720*	36,841	51,887*
Mar.	35,540	32,788	29,505	17,483*	47,003*	42,153*	42,813	54,064*
Apr.	39,686	33,321	27,518	25,928	44,853*	44,247*	52,031	51,797
May	39,386	37,817	30,957	44,074	42,918*	41,101*	50,612	51,733
June	34,195	37,916	41,475	50,743*	40,147*	36,156*	52,772	51,798
July	29,508	31,397	29,976	49,614*	32,553*	35,917*	48,250	43,650
Aug.	30,850	27,586	23,721	44,428*	33,216*	38,775*	46,777	.....
Sept.	25,515	23,638	23,847	35,281*	30,258*	37,086*	46,449	.....
Oct.	27,516	22,277	22,286	31,543*	31,253*	41,969*	49,637	.....
Nov.	23,691	22,943	23,231	28,831*	34,748*	42,310*	50,433	.....
Dec.	21,687	21,409	18,015	28,757*	36,569*	42,474*	49,754	.....
Tot.	375,980	348,986	332,000	400,719*	453,223*	491,544*	575,000	.....

* Revised.

Note: Figures for 1936 were revised on May 15, 1937, and are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,589	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	113,078*	23.0*	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	130,048	22.7	30,573

	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]		Production	Consumption: Tons	Consumption: % to Crude	Stocks[a]
1936*:									
Jan.	11,665	10,922	22.5	17,171	July	12,330	12,856	26.6	16,207
Feb.	10,188	8,014	21.8	18,890	Aug.	12,656	11,959	25.6	16,487
Mar.	10,712	9,539	22.3	19,472	Sept.	12,959	12,153	26.2	16,711
Apr.	11,382	11,241	21.6	19,024	Oct.	14,737	13,715	27.6	17,141
May	11,512	11,311	22.3	18,590	Nov.	14,357	13,087	25.9	17,900
June	11,935	12,563	23.8	17,366	Dec.	15,938	14,126	28.4	19,000
1937:									
Jan.*	15,129	14,450	28.4	18,822	July	17,885	11,924	27.3	16,646
Feb.*	15,192	14,578	28.1	18,490	Aug.	.....	.....	...	.....
Mar.*	14,462	15,601	28.9	16,450	Sept.	.....	.....	...	.....
Apr.	13,884	15,607	30.1	14,046	Oct.	.....	.....	...	.....
May	15,793	14,693	28.4	14,647	Nov.	.....	.....	...	.....
June	16,052	14,414	27.8	14,535	Dec.	.....	.....	...	.....

[a] Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1936 were revised on June 1, 1937, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1935	1936	1937		1935	1936	1937
January	28,147*	32,412*	33,696	August	43,097*	46,081	.....
February	26,580*	27,216*	32,000	September	37,976*	44,346	.....
March	32,272*	35,871	40,561	October	41,566*	44,253	.....
April	36,363*	38,825	43,409	November	35,991*	39,919	.....
May	39,381*	42,007	45,484	December	33,872*	39,393	.....
June	38,086*	44,630	48,580				
July	41,479*	46,638*	.....	Total	434,810*	481,591	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	18,664,356
1928	24,247,282	1932	6,261,330	1936	20,790,098

1937:		1937:		1937:	
January ...	2,123,723	May	2,189,502	September ..	.....
February ..	2,022,258	June	2,141,810	October ...	.....
March	2,166,218	July	1,702,105	November ..	.....
April	2,269,680	August	1,342,945	December ..	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1935																																
May	11 7/8	11½	11 7/8	11½	—	11½	11 7/8	11 5/8	11 1/8	11 1/8	11 1/8	12 1/8	12 1/8	12 3/8	12 3/8	12 5/8	12 5/8	12 7/8	12 7/8	12 5/8	12 5/8	12 3/8	12 3/8	12 1/2	12 1/2	12 3/4	12 3/4	12 5/8	12 5/8	—	12 7/8	12
June	12 7/8	—	12 7/8	12½	12½	12½	12 7/8	12 7/8	12 7/8	12 3/4	12 3/4	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8
July	12 7/8	12¾	—	12¾	—	12¾	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8
August	12 7/8	—	—	—	12¾	12¾	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8	12 7/8
September	—	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½	11½
October	11 7/8	11¾	11 7/8	12	12	12	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8	12 1/8
November	13¼	13⅛	13⅛	13⅛	12 1/8	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼
December	13 7/8	—	13⅜	12 5/8	13	13 7/8	13 7/8	—	13	12 1/8	13	13	13	—	—	—	13 1/8	13 1/8	13	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13⅜	—	13⅜	13⅜	13¼
1936																																
January	15 7/8	13½	13⅝	13⅝	15⅛	15⅛	15⅛	13 1/8	13⅞	14	15⅛	15⅛	14	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8
February	15 7/8	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
March	15 7/8	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
April	15 7/8	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
May	15 7/8	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
June	15 7/8	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
July	16 1/8	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Aug.	16 1/8	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Sept.	16 1/8	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Oct.	16 1/8	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Nov.	17 1/8	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛
Dec.	18½	18½	18½	19	19½	19½	19½	19½	19½	19½	19	19	19	19¼	19¼	19¼	20¼	20¼	20⅜	20⅜	20¼	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜
1937																																
Jan.	21	—	—	20 3/8	20¾	21⅜	21⅛	21⅛	22⅛	21½	22⅜	22⅛	22	21⅛	21⅛	21⅜	21⅜	21⅜	20⅛	20⅛	20⅛	20⅜	20⅜	20⅜	20⅜	21⅜	21⅜	21⅜	21⅜	21⅜	—	21⅜
Feb.	21	21	21⅛	21¼	21¼	21⅜	—	21½	21¼	21¼	21⅜	21⅜	23⅜	23⅜	23⅜	23⅜	24⅜	24⅜	24⅛	24⅛	24⅛	24⅜	24⅜	24⅜	24⅜	21⅜	21⅜	21⅜	21⅜	21⅜	—	21⅜
Mar.	21 1/8	21⅛	21⅛	21⅛	21⅛	22⅛	22⅛	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	24⅜	24⅜	24⅛	24⅛	24⅛	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	—	24⅜
April	26⅜	26⅜	26⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	—	24⅜
May	21	21	21	21⅜	21⅜	21⅜	21⅜	22½	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	—	21⅜
June	20 7/8	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	18½	19⅜	18⅞	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	—	19⅜
July	19⅜	19⅜	19⅜	19⅜	18½	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	—	19⅜
Aug.	18⅞	18⅞	18⅞	—	18½	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	—	18⅞
Sept.	18⅜	18⅜	18⅜	—	—	18⅜	18⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	—	19⅜

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.56

Average Monthly Price per Pound Since 1930

	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents
Jan.	15.24	8.34	4.38	3.08	9.32	13.10	14.35	21.37
Feb.	15.85	7.70	4.03	2.95	10.45	12.92	15.48	21.33
Mar.	15.34	7.71	3.35	3.01	11.01	11.51	15.89	24.09
Apr.	14.93	6.43	3.02	3.56	12.10	11.55	15.98	23.44
May	14.24	6.49	3.09	4.95	13.26	12.05	15.62	21.14
June	12.45	6.35	2.66	6.15	13.51	12.57	15.85	19.29
July	11.24	6.37	2.89	8.01	14.60	12.10	16.49	18.86
Aug.	9.96	5.38	3.63	7.31	15.47	11.98	16.25	18.37
Sept.	8.28	5.08	3.84	7.30	15.36	11.55	16.46	
Oct.	8.20	4.87	3.65	7.64	13.96	12.62	16.55	
Nov.	9.01	4.65	3.44	8.66	13.04	13.15	17.97	
Dec.	9.05	4.64	3.24	8.87	12.98	13.28	20.01	
Average for Year	11.98	6.17	3.49	5.96	12.92	12.37	16.41	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1937 June	1937 July	1937 Aug.	1937 Sept.	Day	1937 June	1937 July	1937 Aug.	1937 Sept.
1	9 13/16	9 3/8	—	8 7/8	17	9½	—	8 11/16	
2	10	9 7/16	—	8 1/2	18	9 11/16	—	8 1/2	
3	9 11/16	—	8¾	8 1/16	19	—	9 1/16	8 1/16	
4	9 5/8	—	8 7/8	—	20	—	9 1/16	8 1/16	
5	—	9 7/16	8 11/16	—	21	9 3/8	8 7/8	—	
6	—	9½	9	8 1/16	22	9 1/16	8 7/8	—	
7	9 3/8	9 3/16	—	9 1/16	23	9½	8¾	8¾	
8	9 3/8	9 1/16	—	9 1/8	24	9¾	—	8 7/8	
9	9 1/16	9 1/16	9	9¼	25	9 7/8	—	8 7/8	
10	9 1/16	—	8 7/8		26	—	8 11/16	8 7/8	
11	9 1/16	—	8 11/16		27	—	8 11/16	8 7/8	
12	—	9¼	8 11/16		28	9 1/16	8 11/16	—	
13	—	9 1/16	8 11/16		29	9½	8¾	—	
14	9 1/16	9 1/16	—		30	9½	8 7/8	8 7/8	
15	9 3/16	9¼	—		31	—	—	8 7/8	
16	9½	9 7/16	8 11/16						

Average Monthly Price Per Pound

Month	1934 Pence	1935 Pence	1936 Pence	1937 Pence	Month	1934 Pence	1935 Pence	1936 Pence	1937 Pence
Jan.	4.429	6.434	6.758	10.378	Aug.	7.401	5.696	7.581	8.830
Feb.	4.920	6.292	7.255	10.503	Sept.	7.409	5.508	7.577	
Mar.	5.136	5.745	7.450	11.766	Oct.	6.806	6.130	7.898	
Apr.	5.712	5.604	7.502	11.471	Nov.	6.294	6.308	8.572	
May	6.207	5.822	7.335	10.250	Dec.	6.295	6.340	9.580	
June	6.245	6.027	7.352	9.548	Average for				
July	7.053	5.801	7.696	9.136	Year	6.159	5.976	7.713	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1937 July	1937 Aug.	1937 Sept.	Date	1937 July	1937 Aug.	1937 Sept.	Date	1937 July	1937 Aug.	1937 Sept.
1	12.62	—	9.29	11	—	10.75		22	12.14	—	
2	12.51	10.96	9.56	12	12.87	10.48		23	11.80	9.86	
3	12.49	11.04	9.36	13	12.94	10.70		24	11.72	9.85	
4	—	11.24	9.42	14	12.97	10.69		25	—	9.78	
5	—	11.35	—	15	12.60	—		26	11.40	9.73	
6	12.56	11.28	—	16	12.52	10.57		27	11.57	9.60	
7	12.62	11.24	9.46	17	12.52	10.56		28	11.44	9.70	
8	12.85	—	9.33	18	—	10.40		29	11.21	—	
9	13.05	10.82	9.37	19	12.51	10.17		30	11.23	9.52	
10	12.90	10.79		20	12.36	10.08		31	11.18	9.38	
				21	12.17	9.99					

Average Monthly Price Per Pound

	1934 Cents	1935 Cents	1936 Cents	1937 Cents		1934 Cents	1935 Cents	1936 Cents	1937 Cents
Jan.	11.25	12.70	11.91	13.06	Aug.	13.40	11.48	12.28	10.41
Feb.	12.28	12.58	11.53	13.15	Sept.	13.00	10.80	12.31	
Mar.	12.30	11.63	11.43	14.46	Oct.	12.48	11.28	12.30	
Apr.	11.80	11.73	11.71	14.23	Nov.	12.53	12.01	12.23	
May	11.44	12.25	11.68	13.34	Dec.	12.76	11.99	12.83	
June	12.20	11.89	12.02	12.70	Average for				
July	12.84	12.26	13.11	12.26	Year	12.36	11.88	12.11	

World Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1935	ON HAND 1936	ON HAND 1937	AFLOAT 1935	AFLOAT 1936	AFLOAT 1937	ON HAND AND AFLOAT 1935	ON HAND AND AFLOAT 1936	ON HAND AND AFLOAT 1937
Jan.	349,446	285,054*	201,915	42,066	43,870	55,096	391,512	328,924*	257,011
Feb.	340,264	282,902*	193,864	42,969	46,532	53,538	383,233	329,434*	247,402
Mar.	340,284	276,823*	191,928*	44,485	58,935	56,994	384,769	335,758*	248,922*
Apr.	337,586	277,478*	174,934	37,651	47,678	72,530	375,237	325,156*	247,464
May	322,558	262,415*	172,985	44,375	48,860	58,542	366,933	311,275*	231,527
June	324,218	245,544*	169,646	55,581	47,228	57,215	379,799	292,782*	226,861
July	334,692	235,850*	164,445	49,018	60,343	75,779	383,710	296,193*	240,224
Aug.	334,106	229,056		47,724	63,597		381,830	292,653	
Sept.	331,121	228,477		43,413	62,240		374,534	290,717	
Oct.	322,857	219,553		49,913	67,825		371,770	287,378	
Nov.	308,993	212,515		46,588	73,691		355,581	286,206	
Dec.	303,000	218,844		39,094	56,567		342,094	275,411	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

Note: Complete figures for 1934 and 1935 were revised by the R.M.A. on May 1, 1936.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1935	London 1936	London 1937	Liverpool 1935	Liverpool 1936	Liverpool 1937
January	81,807	84,791	29,005	66,405	77,188	41,895
February	87,605	79,757	26,508	67,983	77,138	37,078
March	92,664	74,779	21,292	69,218	72,823	30,622
April	94,361	68,932	21,128	70,584	71,388	27,443
May	95,722	61,349	21,351	71,927	69,150	25,081
June	98,077	55,993	21,964	73,131	66,173	21,258
July	99,226	49,575	22,589	74,915	63,715	19,424
August	101,574	45,749		75,584	62,367	
September	101,198	44,364		76,263	59,485	
October	94,749	40,777		76,400	55,738	
November	90,542	37,495		76,301	51,184	
December	86,551	33,027		77,589	45,291	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [2]	Holland	Para and Manaos
At end of 1936					
August	28,289	34,849	3,961	979	1,742*
September	26,936	33,351	3,930	911	1,817
October	24,593	34,941	3,490	773	1,820
November	26,761	33,469	3,415	588	1,948
December	26,969	35,145	5,161	409	2,454
At end of 1937					
January	36,365	41,911	5,024	290	4,005
February	42,132	44,346	5,855	197	3,763
March	42,485	40,317	3,477	108	4,078
April	38,812	38,443	3,745	101	3,840
May	34,234	40,253	3,781	94	3,559*
June	45,085	48,545	4,558	98	1,019

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

End of: 1936:	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
July	60,343	20,300	25,357	106,000
August	63,597	19,800	15,603	99,000
September	62,240	18,090	15,670	96,000
October	67,825	20,790	17,385	106,000
November	73,691	19,270	13,039	106,000
December	56,567	24,800	21,633	103,000
End of: 1937				
January	55,096	24,920	17,984	98,000
February	53,538	27,250	13,212	94,000
March	56,994	31,240	36,766	125,000
April	72,530	34,410	17,060	124,000
May	58,542	31,500	26,493	117,000
June	57,215	35,000	32,785	125,000
July	75,779	35,000	33,221	144,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P—Preliminary estimate.

TOTAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1932	1933	1934	1935	1936*	1937
January	623,416*	634,797	661,948	698,153	600,479	454,249*
February	611,819*	626,227	663,308	686,195	599,355	445,265*
March	614,894*	638,428	666,382	678,809	583,318	447,385*
April	615,893*	629,159	659,796	677,006	567,172	428,249*
May	612,474*	626,537	689,239	677,569	541,871	413,134*
June	595,712	613,055	672,804	671,525	520,255	432,257
July	589,037	618,258	676,200	679,061	519,074	.....
August	597,274	617,449	674,702	680,644	500,520	.....
September	599,986	623,683	694,361	661,509	493,585	.....
October	609,368	636,597	680,616	655,000	486,159	.....
November	614,342	642,968	684,408	617,300*	466,491	.....
December	629,898	654,890	705,975	613,987*	466,576	.....
Monthly Avge.	609,502*	630,171	677,395	666,397*	528,738	.....

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1929	1930	1931	1932	1933	1934	1935	1936
Production	68,726	50,965	48,740	40,085	45,303	47,233	49,362	58,116
Shipments	69,395	53,638	50,061	40,251	44,094	46,687	50,183	55,363
Inventory [2]	11,838	9,003	7,775	7,644	8,888	9,455	8,196	11,114

Figures for Recent Months

	PRODUCTION 1935	PRODUCTION 1936*	PRODUCTION 1937	SHIPMENTS 1935	SHIPMENTS 1936*	SHIPMENTS 1937	INVENTORY 1935	INVENTORY 1936*	INVENTORY 1937
Jan.	4,626	4,579	4,980	3,663	3,875	4,509	10,398	8,917	11,377
Feb.	4,383	3,579	5,246	3,287	3,212	4,371	11,530	9,265	12 309
Mar.	4,346	3,640	5,916	4,204	3,857	5,787	11,675	9,087	12,448
Apr.	4,512	4,857	5,730	5,144	4,904	5,560	11,003	9,035	12,629
May	4,175	4,974	5,352	4,067	5,833	5,375	11,131	8,178	12,592
June	3,910	5,612	5,339	4,262	5,793	5,389	10,755	7,835	12,529
July	3,532	5,466		5,447	5,744		8,850	7,750	
Aug.	3,993	5,017		4,739	4,977		7,805	7,799	
Sept.	3,787	4,984		3,303	3,837		8,288	9,012	
Oct.	4,051	5,126		4,055	4,082		8,291	10,096	
Nov.	3,997	4,972		3,930	4,233		8,249	10,823	
Dec.	4,051	5,311		4,081	5,016		8,196	11,114	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1929	1930	1931	1932	1933	1934	1935	1936
Production	68,829	52,420	48,333	36,891	42,556	46,228	47,879	57,607
Shipments	70,592	54,938	50,021	37,911	41,391	45,046	48,067	54,626
Inventory [2]	12,807	9,999	7,922	6,749	7,815	9,180	8,231	10,985

Figures for Recent Months

	PRODUCTION 1935	PRODUCTION 1936	PRODUCTION 1937	SHIPMENTS 1935	SHIPMENTS 1936	SHIPMENTS 1937	INVENTORY 1935	INVENTORY 1936	INVENTORY 1937
Jan.	4,259	4,592	4,801	3,722	4,168	4,391	9,621	8,623	11,100
Feb.	4,171	3,556	5,091	3,362	3,446	4,536	10,466	8,699	11,734
Mar.	4,123	3,787	5,823	4,168	3,796	5,570	10,406	8,692	11,904
Apr.	4,259	4,824	5,627	4,453	4,746	5,325	10,170	8,788	12,218
May	3,892	4,819	4,956	3,451	4,919	5,028	10,615	8,719	12,107
June	3,480	5,035	4,716	4,024	5,504	5,027	10,050	8,105	11,74c
July	3,251	5,177		5,269	5,758		8,005	7,725	
Aug.	3,894	5,039		4,556	5,136		6,939	7,621	
Sept.	4,125	5,161		3,426	4,231		7,565	8,627	
Oct.	4,435	5,397		3,987	4,108		8,053	9,977	
Nov.	3,942	4,739		3,687	3,995		8,161	10,732	
Dec.	4,048	5,121		3,962	4,819		8,231	10,985	

(1) These figures have been adjusted to represent 100% of the industry based on reports received by the Rubber Manufacturers' Association which represent 80% for 1931-1932-1933; 97% for 1934-1935; 81% for 1936. All figures through September, 1936, were revised in December, 1936. Annual figures are more accurate.
(2) Held by manufacturers at end of period indicated.
(*) Revised.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1936							
Sept.*	135,165	90,101	45,064	4,655	2,481	2,174	139,820
Oct.*	224,688	190,242	34,446	5,361	4,592	769	230,049
Nov.*	394,987	341,085	53,902	10,812	10,086	726	405,799
Dec.*	498,710	425,365	73,345	20,411	16,542	3,869	519,121
1937							
Jan.*	380,051	309,637	70,414	19,583	14,697*	4,886*	399,634
Feb.*	363,991	296,636	67,355	19,707	14,173*	5,534*	383,698
Mar.*	494,276	403,879	90,397	24,901*	19,127*	5,774*	519,177
Apr.	536,334	439,980	96,354	17,081	12,927	4,154	553,415
May	516,899	425,432	91,467	23,458	17,980	5,478	540,357
June	497,298	411,394	85,904	23,841	17,919	5,922	521,139
July	438,834	360,275	78,559	17,941	12,513	5,428	456,775

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]							DUTCH EAST INDIES [4]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [4]	World Total [1]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,062	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,386	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,384	11,003	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,758	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	140,659	18,394	9,883	2,737	946,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1935:															
Nov.	43,147	10,518	32,629	4,288	2,273	1,141	455	2,303	3,724	3,818	8,863	2,445	907	876	63,722
Dec.	37,838	7,529	30,309	4,942	3,028	1,233	171	3,079	3,881	5,206	5,854	4,532	1,352	1,122	62,709
1936:															
Jan.	39,101	12,582	26,519	4,178	1,299	2,317	938	1,665	4,315	6,347	9,381	2,449	1,606	839	61,853
Feb.	38,436	18,857	19,579	3,664	1,382	2,107	529	3,663	4,789	6,643	15,851	2,892	1,201	1,051	63,353
Mar.	46,552	12,026	34,526	4,336	1,324	1,848	342	2,966	4,484	5,052	9,225	2,553	1,264	751	68,671
Apr.	36,251	14,702	21,549	3,172	1,230	2,053	869	1,596	4,895	6,446	13,032	2,416	1,056	947	59,261
May	46,568	12,527	34,041	2,560	1,117	2,354	517	2,077	4,258	6,015	10,766	2,281	956	776	67,718
June	40,049	15,026	25,023	3,766	1,226	1,386	461	3,737	4,577	6,519	14,588	2,733	917	823	65,756
July	53,114	19,038	34,076	3,773	1,359	1,399	1,035	3,734	6,133	8,578	17,946	2,738	964	933	82,668
Aug.	43,506	13,361	30,145	3,940	776	2,541	656	3,284	4,978	7,353	12,106	3,017	542	1,054	70,392
Sept.	44,110	10,039	34,071	5,367	664	1,139	537	3,259	4,531	6,241	10,175	3,505	1,119	937	71,545
Oct.	46,543	12,960	33,583	5,599	1,181	2,143	1,086	3,349	6,477	8,145	12,881	3,874	1,255	1,105	80,678
Nov.	47,342	16,923	30,419	4,960	1,322	1,950	701	2,260	5,398	7,109	16,718	3,872	1,592	1,163	77,464
Dec.	38,714	9,758	28,956	4,377	1,844		506	2,988	6,472	10,129	9,536	8,450	1,721	1,087	76,072
1937:															
Jan.	41,571	16,956	24,615	4,541	1,077	4,063	1,234	3,849	5,136	8,011	13,102	2,828	1,271	1,000*	70,727
Feb.	38,058	14,048	24,010	5,619	1,831	2,043	790	3,554	5,484	7,656	12,414	3,074	1,692	1,000*	69,167
Mar.	59,568	19,579	39,989	7,066	2,040	1,425	1,239	3,873	7,791	11,848	19,969	3,173	1,749	1,000*	101,162
Apr.	58,718	17,136	41,582	3,423	1,203	2,960	783	1,899	6,999	8,967	15,989	2,094	1,522	1,000*	88,421
May	51,152	17,350	33,802	4,612	1,012	742	778	2,238	7,530	8,981	21,085	2,887	1,063	1,000*	85,730
June	54,809	23,614	31,195	5,180	1,100	1,890	813	2,933	8,269	12,467	25,225	3,669	762	1,000*	94,503
July	72,704	26,100	46,604	6,285	976	2,543	1,414	3,195	7,512	11,610	23,913	5,563	956*	1,000*	111,565
Aug.	64,525	21,398	43,127												

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Nether-lands	Scandi-navia (abcdf)	Spain (g)	Czecho-slovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	17,000*	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,976
1936:															
April	44,948	2,097	4,250	5,497	1,079	4,929	1,500*	3,251	919	1,097	238	848	679	603	71,935
May	35,549	302	4,335	4,639	2,221	5,531	1,000*	4,220	1,034	698	103	657	500*	667	61,456
June	35,901	—1,493	4,846	5,698	2,042	4,567	1,500*	2,427	1,635	579	—27	650	500*	323	59,148
July	38,556	—766	4,621	6,837	2,274	5,126	2,000*	1,733	1,363	713	183	1,094	500*	495	64,729
Aug.	41,094	—1,581	4,513	6,556	3,781	4,305	1,500*	3,128	807	789	42	1,145	500*	989	67,440
Sept.	49,483	—12	4,393	6,006	2,393	5,195	1,500*	2,922	2,297	514	471	1,090	300*	624	77,176
Oct.	40,301	—87	4,752	7,232	3,110	6,600	1,500*	2,761	1,092	817	343	1,171	200*	1,026	70,818
Nov.	37,897	—742	3,282	6,500	4,308	3,961	1,500*	2,162	964	1,090	445	1,388	200*	823	63,778
Dec.	50,838	—4,926	4,688	7,458	1,193	8,698	1,500*	3,426	1,184	759	276	1,206	200*	1,701	78,201
1937:															
Jan.	42,655	33	4,430	7,041	1,632	8,357	1,700	2,633	582	854	269	1,115	200*	567	72,368
Feb.	44,398	—222	5,296	7,911	1,271	6,630	1,502	3,048	304	1,363	245	452	200*	837	73,233
Mar.	39,888	343	5,347	7,668	2,612	6,935	2,119	3,598	1,293	1,641	371	709	200*	601	72,727
Apr.	42,066	3,808	5,291	8,664	1,343	5,837	1,669	1,532	1,058	1,069	362	1,070	200*	1,445	80,414
May	48,506	6,100	5,558	6,706	4,187	8,596	2,772	1,886	1,290	2,113	361	1,576	200*	925	90,776
June	48,972	5,157	6,010	6,469	3,791	7,608	1,958	3,940	2,226	1,630	521	1,802	200*	1,150	91,434
July		10,628	4,306	7,860		4,851					497				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

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